

thinklogical®

Velocitydvi-3

HDCP Compliant Single-Link Fiber Extension Systems

HDCP
Compliant Extenders



PRODUCT MANUAL

Revision H, October 2016

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thinklogical®

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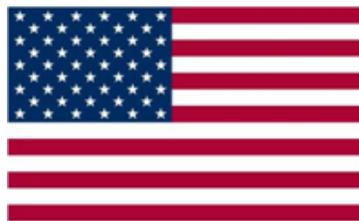
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MRTS Technology



thinklogical®



Subject: VelocityDVI-3 HDCP Compliant Digital Video Extender Product Manual
Revision: H, October, 2016



MADE IN USA



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PREFACE

About Thinklogical



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Thinklogical, LLC®
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Milford, CT 06460

We, the Thinklogical team, are committed to understanding and exceeding our customers' requirements, the first time and every time.

Thinklogical, LLC is the leading manufacturer and provider of fiber optic and CATx KVM, video, audio, and peripheral extension and switching solutions used in video-rich, big-data computing environments.

Thinklogical offers the only fiber-optic KVM matrix switches in the world that are accredited to the Common Criteria EAL4, TEMPEST SDIP 24 Level B, and NATO NIAPC Evaluation Scheme: GREEN and the U.S. DoD DISA JITC UCR 2013 APL information assurance standards. And Thinklogical Velocity products are the first system with both KVM and video matrix switching capabilities to be placed on the Unified Capabilities Approved Product List (UC APL) under the Video Distribution System (VDS) category.

Governments, entertainment, scientific and industrial customers worldwide rely on Thinklogical's products and solutions for security, high performance, continuous operation and ease of integration. Thinklogical products are designed and manufactured in the USA and are certified to the ISO 9001-2008 standard.

Information Assurance

ISO 9001:2008 CERTIFIED COMPANY

NATO

Common Criteria

TEMPEST

NATO Information Assurance Product Catalogue NIAPC

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Note and Warning Symbols

Throughout this manual you will notice certain symbols that bring your attention to important information. These are **Notes** and **Warnings**. Examples are shown below.



Note: Important Notes appear in blue text preceded by a yellow exclamation point symbol, as shown here.

A note is meant to call the reader's attention to helpful information at a point in the text that is relevant to the subject being discussed.



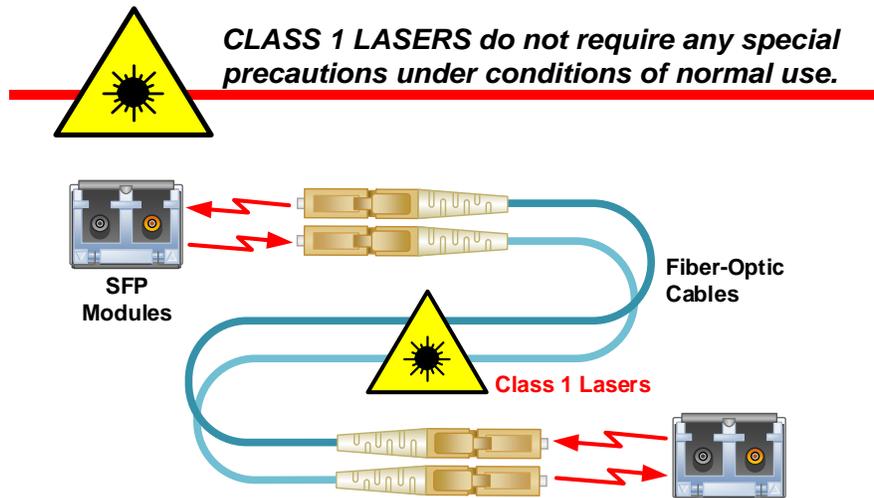
Warning! All Warnings appear in red text, followed by blue text, and preceded by a red stop sign, as shown here.

A warning is meant to call the reader's attention to critical information at a point in the text that is relevant to the subject being discussed.

BEFORE STARTING ANY PROCEDURE, IT IS RECOMMENDED THAT YOU READ THE INSTRUCTIONS THOROUGHLY!

Class 1 Laser Information

Velocity Extenders, like all Thinklogical® products, are designed and identified as a **Class 1 LASER products**. This means the maximum permissible exposure (MPE) cannot be exceeded when viewing the laser with the naked eye or with the aid of typical magnifying optics (e.g. telescope or microscope).



Note: Drawings in this document are not to scale.

1. Introduction

1.1 Contents

Upon receiving your **Thinklogical VelocityDVI HDCP Compliant Extension System®** you should find the following items:

- DVI Extender Transmitter (DVI Scaling Receiver Extender is Receiver only)
- DVI Extender Receiver
- DVI-D Male to Male Cable, 2 Meter (CBL-000009-002MR) Quantity 1
- Universal AC Power Adapters (PWR-000022-R) – Quantity 2
- CAT5 Cable Assembly (CBL000001-002MR)²
- 3.5mm Audio Cable, M-M – Quantity 2 (CBL000016-006FR)²
- DB9F Adapter (ADP-000025-R) and DB9M Adapter (ADP-000019-R)³
- CD Product Manual

¹ For VelocityDVI-3, (1 each).

² With A/V+, A/N+, AH and NH models

³ With A/V+ models only

1.2 Product Overview

MRTS Technology's 6.25 Gbps. allows for Full Frame Rate Transmission of uncompressed DVI. Powered by Thinklogical's® patented, cutting edge **MRTS (Multi Rate Transmission System) Technology**, our DVI Extension Systems transport every frame of a DVI video stream seamlessly with no compression or dropped frames. In addition, all high speed peripherals function with no latency. Incorporating standard SFP+ transceivers, the system uses multi-mode fiber optic cable to permit the placement of a digital monitor or projector up to 1000 meters (3280 feet) away from the controlling computer without loss of resolution. Thinklogical also offers optics that use single-mode fiber optic cables to allow the placement of video devices up to 10, 40 or 80 km (6.2/24.8/49.7 miles) away from the controlling computer without loss of resolution. Installation is plug-and-play and no adjustments are necessary.

Each VelocityDVI-3 HDCP* (single-link) system consists of one transmitter per chassis and one receiver per chassis. All models support Data Display Channel (DDC), with a variety of modes to meet each unique requirement. All models are connected by fiber optic cable(s), the number of which varies depending upon the DDC mode, to provide communications to and from the transmitter. The transmitter unit connects to the CPU with supplied DVI-D cables (and audio, serial & network cables in our A/V+, A/N+, AH and NH models). The receiver unit provides an interface to the monitor(s) (and audio, serial & network devices in our A/V+, A/N+ AH, NH and video format Scaling Receiver models).

Each Transmitter (TX) features a video input and local video output which can be used for DDC modification and for displaying video at the source. The TX also has fiber connectors used for transferring video and data to the Receiver and data back from the Receiver. Status LEDs and DDC Mode buttons are provided for system configuration.

Each Receiver (RX) features two video outputs. *DVI to Display DDC* is the primary output and *DVI to Display* is an auxiliary output. The RX has fiber connectors used for transferring data to the TX and for receiving video and data from the TX. Status LEDs and DDC Mode buttons are provided for system configuration.

***High-bandwidth Digital Content Protection:** A specification used to encrypt and protect digital video and audio signals transmitted between two HDCP-enabled devices.

1.3 VelocityDVI-3 HDCP Model Numbers

VEL-0H0003-LCTX	Velocity-3H, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, TX, LC
VEL-0H0003-LCRX	Velocity-3H, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, RX, LC
VEL-0000S3-LCRX	Velocity-3H, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Scaling Receiver, RX, LC
VEL-AH0003-LCTX	Velocity-3AH, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Audio, Serial, TX, LC
VEL-AH00S3-LCRX	Velocity-3AH, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Audio, Serial, RX, LC
VEL-A000S3-LCRX	Velocity-3AH, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Audio, Scaling Receiver, RX, LC
VEL-NH0003-LCTX	Velocity-3AH, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Network, TX, LC
VEL-NH0003-LCRX	Velocity-3AH, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Network, RX, LC
VEL-N000S3-LCRX	Velocity-3AH, HDCP Compliant, DVI Video Extender, Single Link DVI, AUX DVI Output, DDC, Network, Scaling Receiver, RX, LC



2. System Features

2.1. General System Features

Thinklogical's VelocityDVI Extender Systems® are designed for high resolution video extension applications, such as remote projection centers, theaters and assembly halls, and for secure computer installations. The ability to remotely locate the CPU away from the monitor allows more control of your computer environment. It is now possible to position your monitor or projector in any setting from office to lecture hall to boardroom while keeping the computer secure in a remote, controlled location.

VelocityDVI HDCP Compliant Extender Systems® include the following features:

- Supports one Single-Link DVI Signal
- HDCP compliant
- DDC2B compliant
- Extends DVI up to 1000 meters using OM4 multi-mode fiber
- Extends DVI up to 80km using single-mode fiber
- Signal transmission via fiber optic cable; no RF interference
- Flawless image quality with no frame dropping
- Class 1 laser product
- Simple plug and play
- Requires 1 or 2 fibers, depending upon the application
- AH, NH and Scaling Receiver models support up to 8 channels of embedded audio

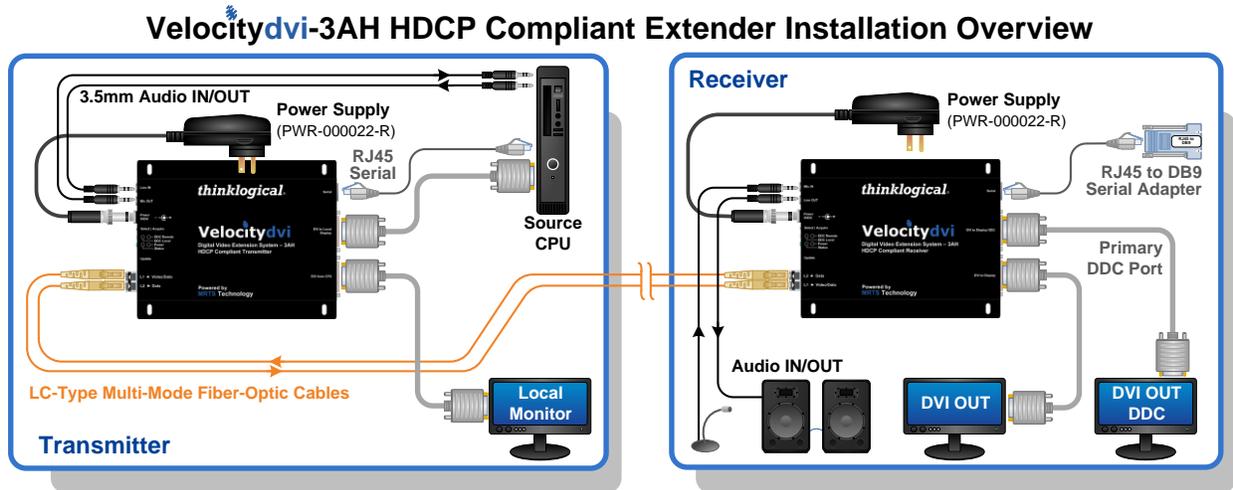
2.1.1 VelocityDVI-3 Scaling Receiver Features

The VelocityDVI-3 Scaling Receiver offers improved performance and a substantially easier integration by automatically formatting video signals using the display's native/preferred timing. By enhancing automatic EDID management, the Scaling Receiver is the ideal solution for system environments with a variety of displays and sources with multiple resolutions. Features and benefits include:

- Supports one Single-Link DVI signal
- HDCP compliant
- AH, NH and Scaling Receiver models support up to 8 channels of embedded audio
- Available support for audio and serial interfaces (3AH model)
- Available support for audio and network interfaces (3NH model)
- Multi-mode or single mode fiber capability
- Compatible with any Thinklogical Velocity transmitter
- Configurable text overlay notifies user of active video input and output formats
- AH, NH and Scaling Receiver models support up to 8 channels of embedded audio

2.2. Basic operation

The VelocityDVI Extender System transmits video and data information from the Transmitter to the Receiver through fiber L1. Fiber L2 is the data return path, including EDID, from the Receiver to the Transmitter.



2.3 Single Fiber operation

The unit will operate with a single fiber from the TX to the RX. In this mode of operation, the TX can transmit video and status LED information to the RX. The RX cannot send any information to the TX. In this mode the RX buttons are inoperative. Also, DDC information can only be gathered from the TX local port or the Thinklogical default EDID table.

2.4 Dual Fiber Operation

In this mode video information is transmitted from the TX to the RX over fiber L1. Fiber L2 is used as a data return path from the RX to the TX. Providing a back channel from the RX to the TX allows the RX to modify DDC configuration via the Acquire and Select buttons and allows the RX to send DDC information to the TX. DDC information exchange allows the PC to gather information about the connected monitor to determine the display properties.

2.5 Velocity Scaling Receiver Operation

Each of Thinklogical's three Scaling Receivers, the Velocity-3S, Velocity-3SA (Audio) and Velocity-3SN (Audio/Network) are HDCP compliant. Each Scaling Receiver automatically scales the video output format to the connected monitor's preferred timing resolution and supports up to 8 channels of embedded audio. As with all HDCP compliant models, Scaling Receiver receivers are available with LC-Type fiber connectors only. (For information regarding user definable operating parameters and settings, See **Appendix D: VelocityDVI-3 RX Scaling Receiver GUI Instructions** on page 32.

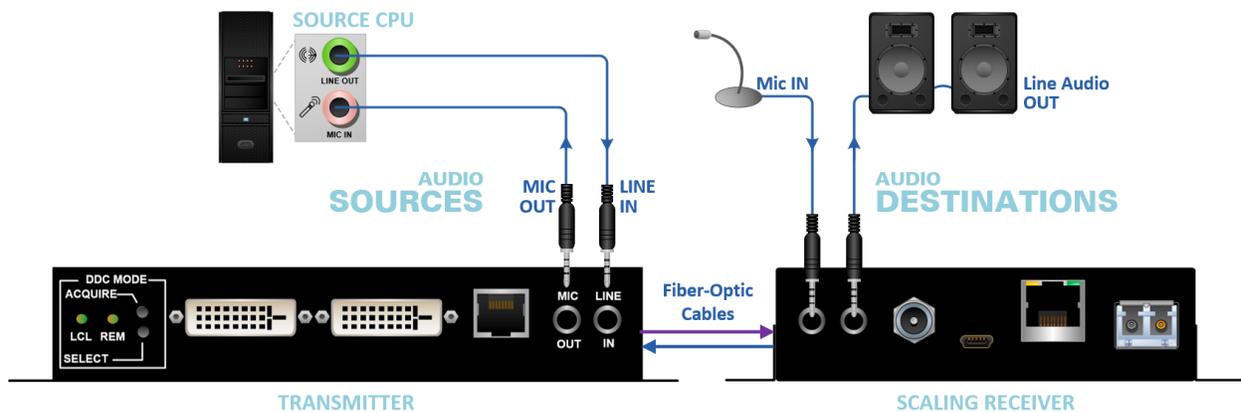


2.6 Technical Specifications

Technical Specifications (VelocityDVI-3 HDCP)	
Video Resolution	Any single-link DVI resolution (Pixel clocks up to 165 MHz)
Panel Connectors	Transmitters and Receivers Video DVI-D (2) Power 2.5 mm power connector Update USB Mini-B Fiber Connections LC
Options Connectors	Transmitters and Receivers Audio 3.5mm (2) Network RJ45 (1) Serial RJ45 (1)
Operating Temperature and Humidity	0-50 °C (32-122° F, 5-95% RH, non-condensing)
Storage Temperature	-20 to 70° C (-4 to 158° F)
Indicators	<i>LEDs on each DVI Extender unit:</i> Power, Connection Status, DDC Modes - Local, Remote
Weight	<1 lb. (0.45 kg) each
Shipping Weight	4 lb. (1.81 kg) pair
Dimensions	<i>See page 19</i>
Optical Cable	2 fibers (available, not supplied)
Optical Distance	Up to 350m, 750m, 1000m, 80km
Supply Voltage	+5.0 VDC
Power Consumption	6 watts per unit
DC Adapter	AC/DC adapter, universal input 90-264 VAC (PWR-000022-R)
DB9 to RJ45 Adapters	<i>With AH, NH, SA and SN models only:</i> DB9M to RJ45 (ADP-000019-R) DB9F to RJ45 (ADP-000025-R)
Copper Video Cables	CBL000009-002MR Single-link DVI-D Male to Male, 2m (Qty. 1)
Compliance	Approvals for US, Canada, and European Union
Warranty	<i>12 months from date of shipment.</i> <i>Extended warranties available at time of purchase.</i>

2.7 Velocity Unbalanced Audio Specifications

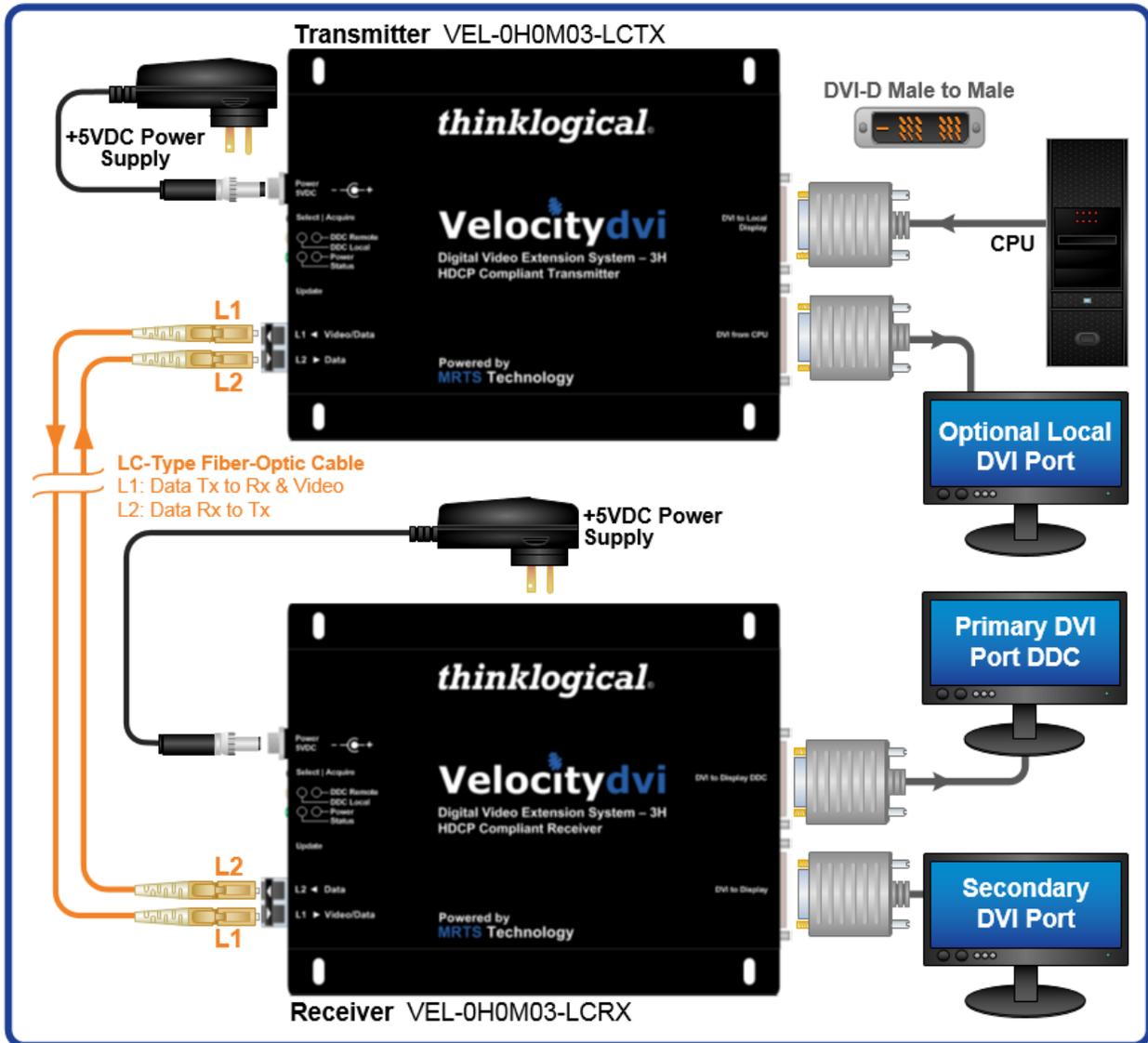
Audio Sampling Rate	46.875 kHz
Transmitter	
Line In Impedance	10 K Ω
Line In Level (max)	2.5 Vpp (0.884 Vrms, 1.15 dBu)
Mic Out Impedance	300 Ω
Mic Out Level (max)	0.45 Vpp (0.159 Vrms, -13.75 dBu)
Receiver	
Line Out Impedance	560 Ω
Line Out Level (max)	3 Vpp (1.6 Vrms, 2.72 dBu) into 1 k Ω
Mic In Impedance	5 k Ω
Mic In Level (max)	0.24 Vpp (0.085 Vrms, -19.2 dBu)



A VelocityDVI-3 AV+ Transmitter connected via fiber-optic cables to a VelocityDVI-3 Scaling Receiver

3. Installing DVI Extenders

All physical connections to these products use industry-standard connectors.



It is recommended that you securely mount each VelocityDVI chassis before installing the cabling and power sources. Please refer to the following appendices at the back of this manual:

[Appendix A: Installation Overview on page 28](#)

[Appendix B: DVI Extender Mounting on page 30](#)

[Appendix C: RJ-45 Adapter Pin-outs on page 31](#)

3.1 AC Power

Two wall pack AC/DC adapters (PWR-000022-R) are included with the VelocityDVI-3H models. The AC wall pack has a universal power rating of 100-240VAC, 50-60Hz and also has interchangeable wall plug adapters for various international AC power receptacles (below).



- +5VDC
- Continuous Short Circuit Protection
- Over Voltage Protection
- Conductive EMI Meets CISPR/FCC Class B high efficiency, 75% Typical
- International Receptacle Adapters



International Receptacle Adapters for the PWR-000022-R +5VDC Power Supply

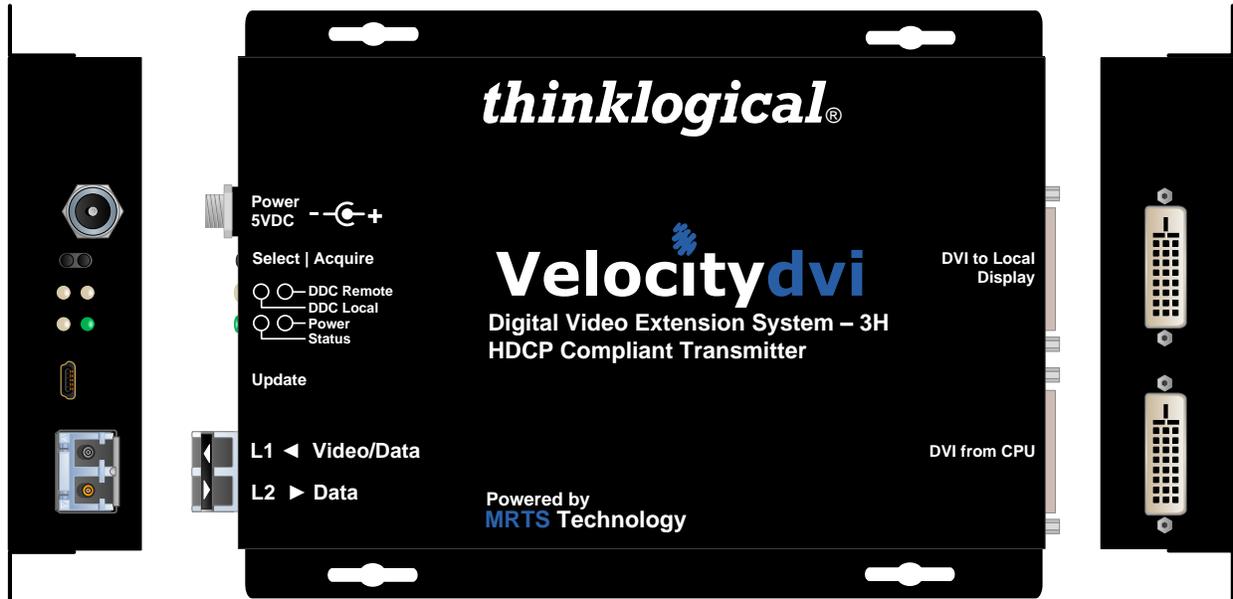
3.2 VelocityDVI-3 HDCP Compliant Extender Housings



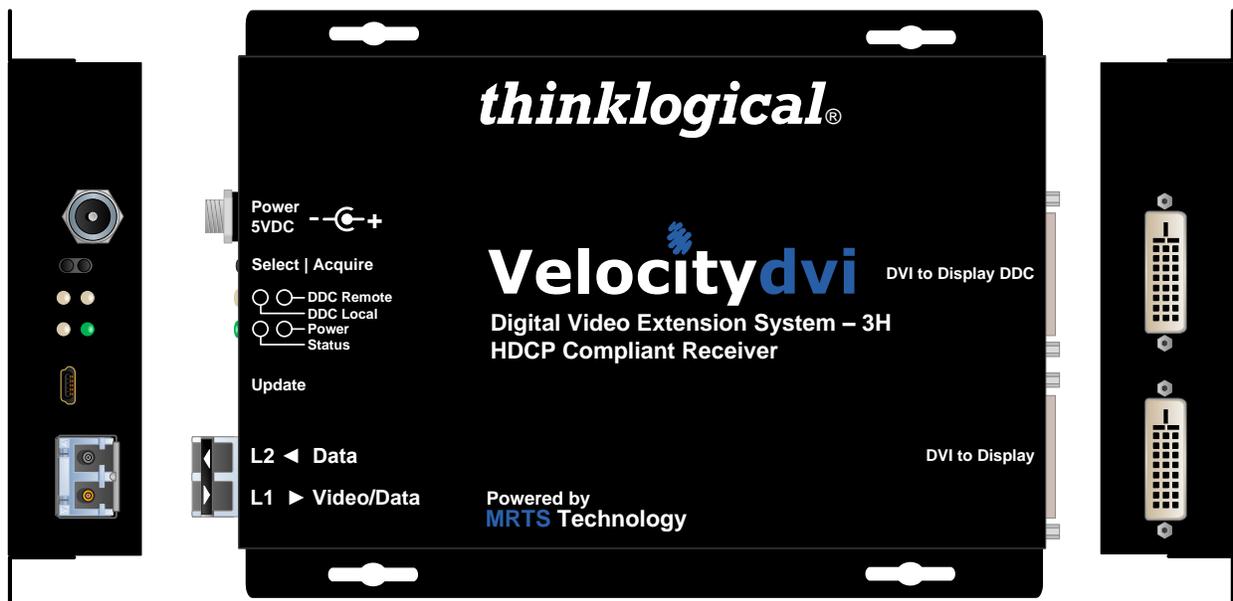
Note: The following drawings are not to scale

Velocity-3H HDCP Compliant VEL-0H0003-LCTX-RX

TRANSMITTER



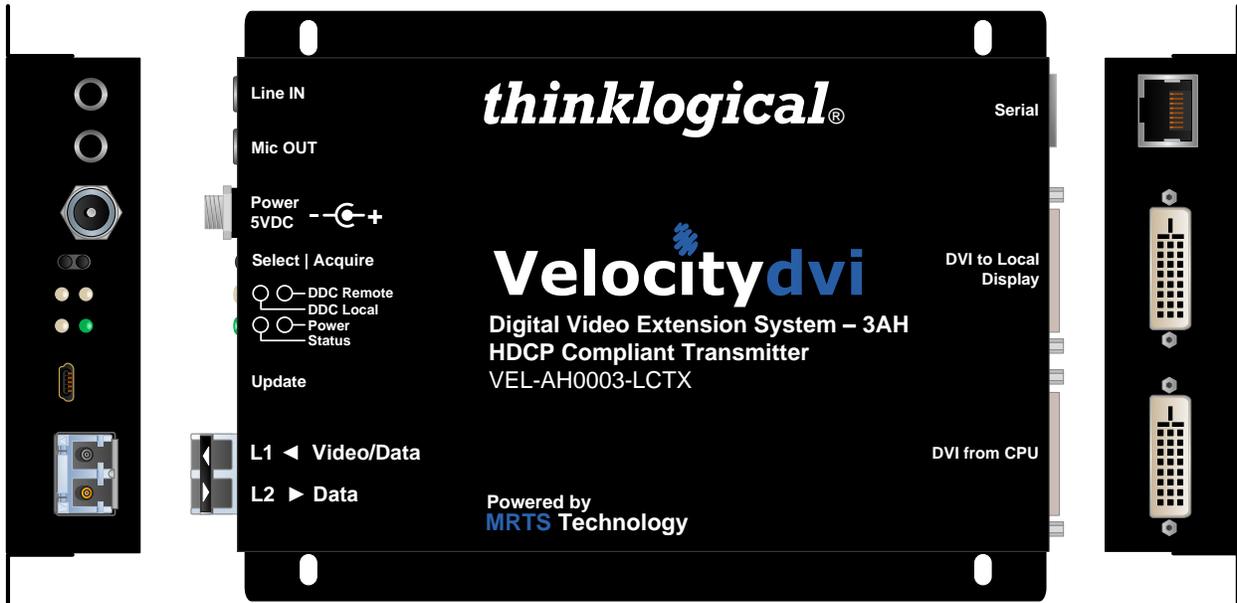
RECEIVER



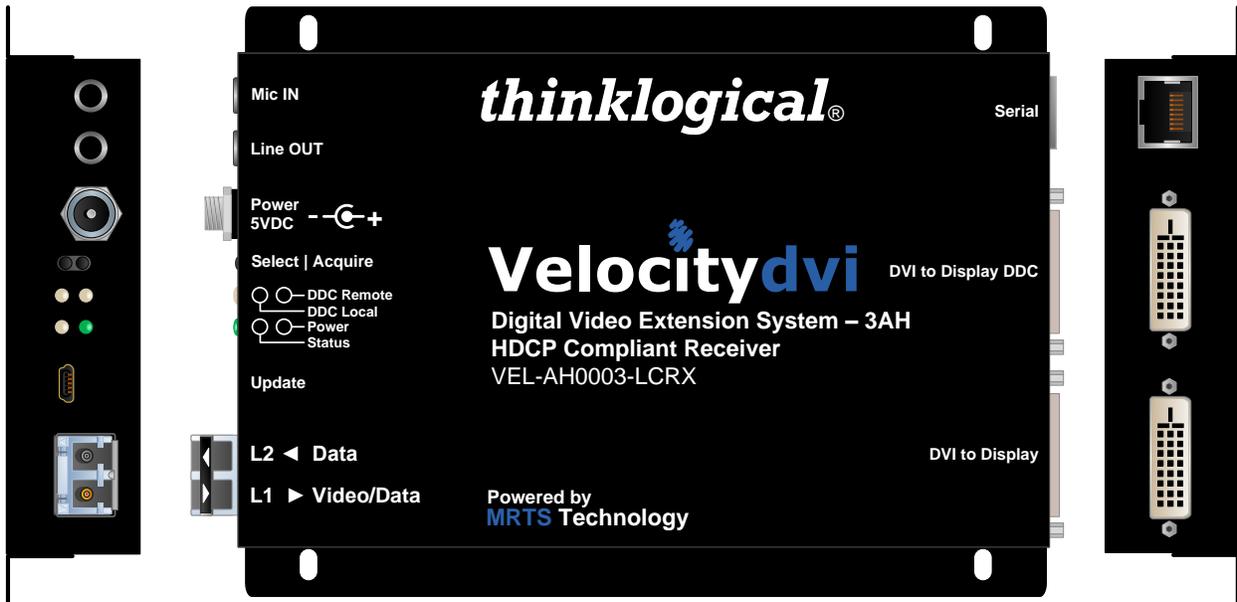
5.57" W x 7.00" D x 1.13" H (14.15cm x 17.78cm x 2.87cm)

**Velocity-3AH Audio/Serial HDCP Compliant
VEL-AH0003-LCTX-RX**

TRANSMITTER



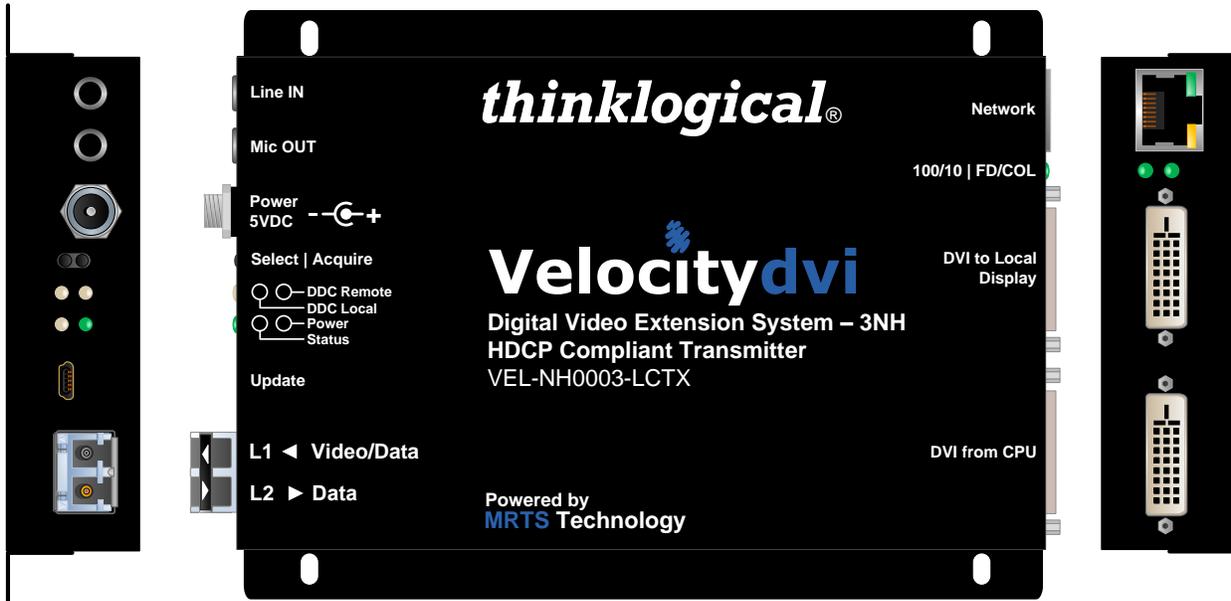
RECEIVER



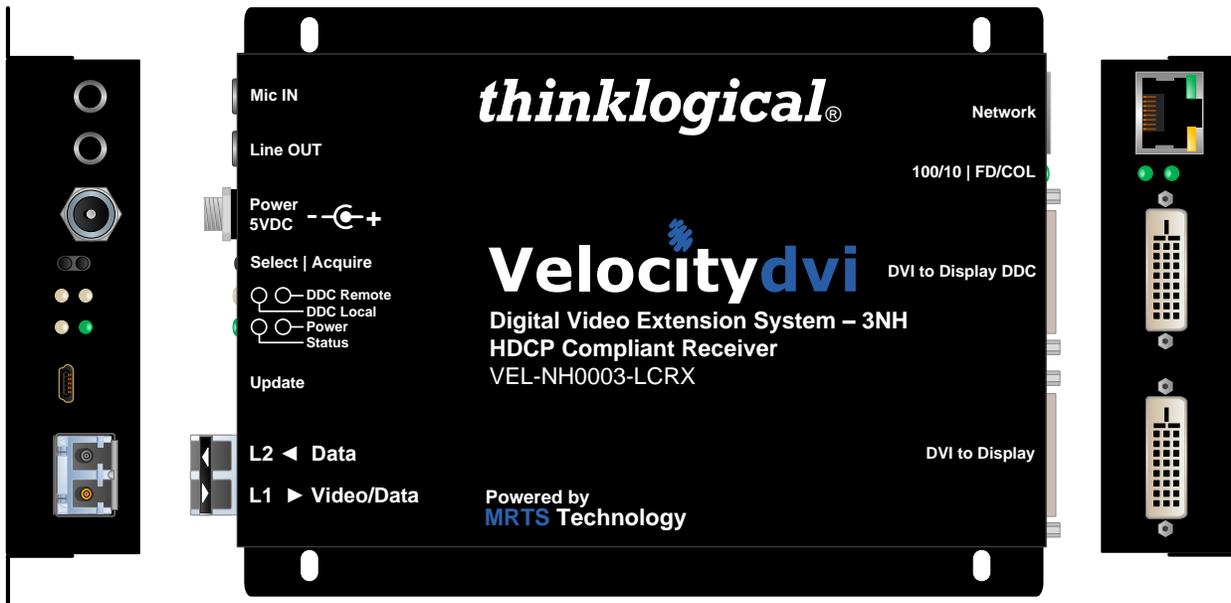
5.57" W x 7.00" D x 1.13" H (14.15cm x 17.78cm x 2.87cm)

Velocity-3NH Audio/Network HDCP Compliant
VEL-NH0003-LCTX-RX

TRANSMITTER

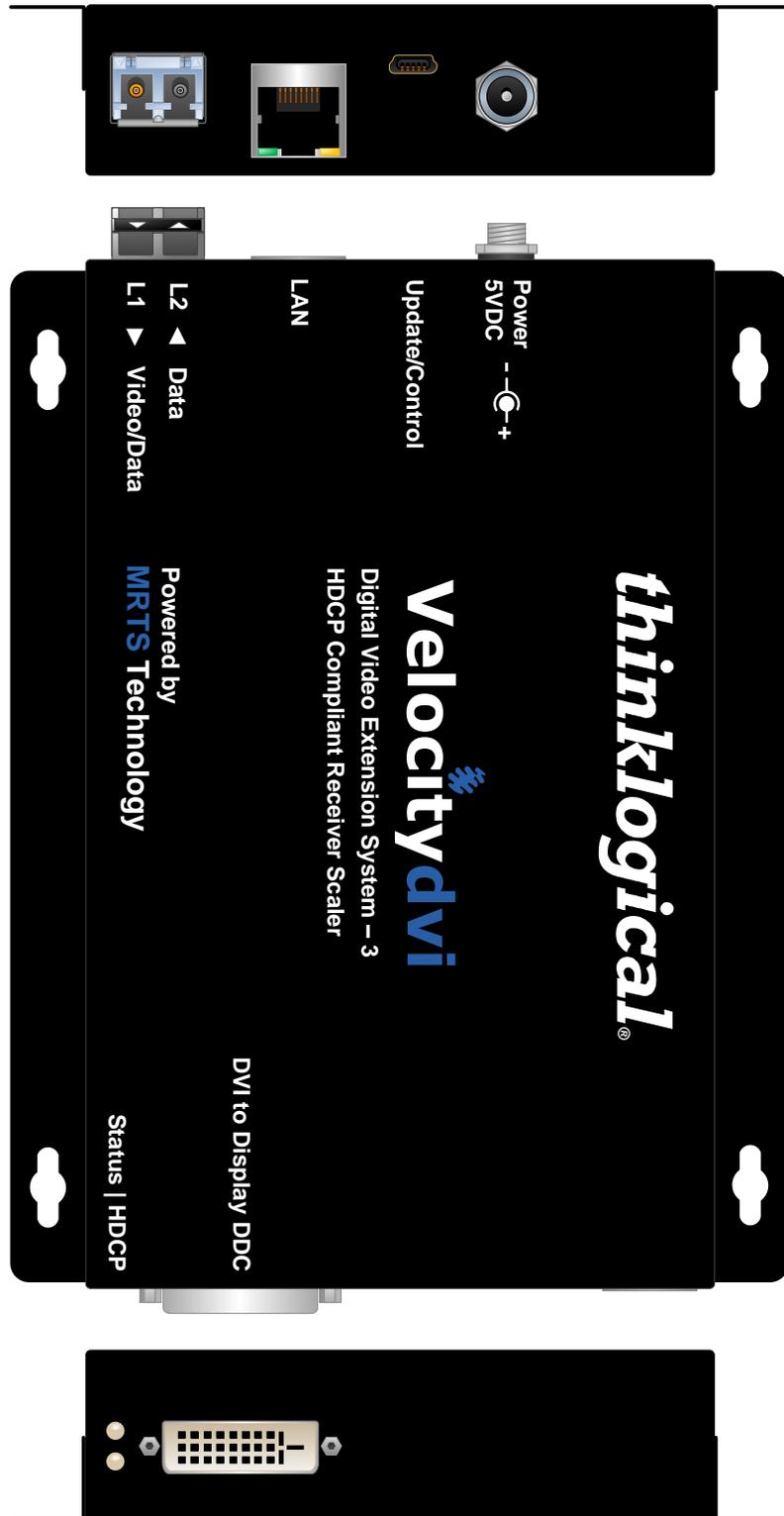


RECEIVER



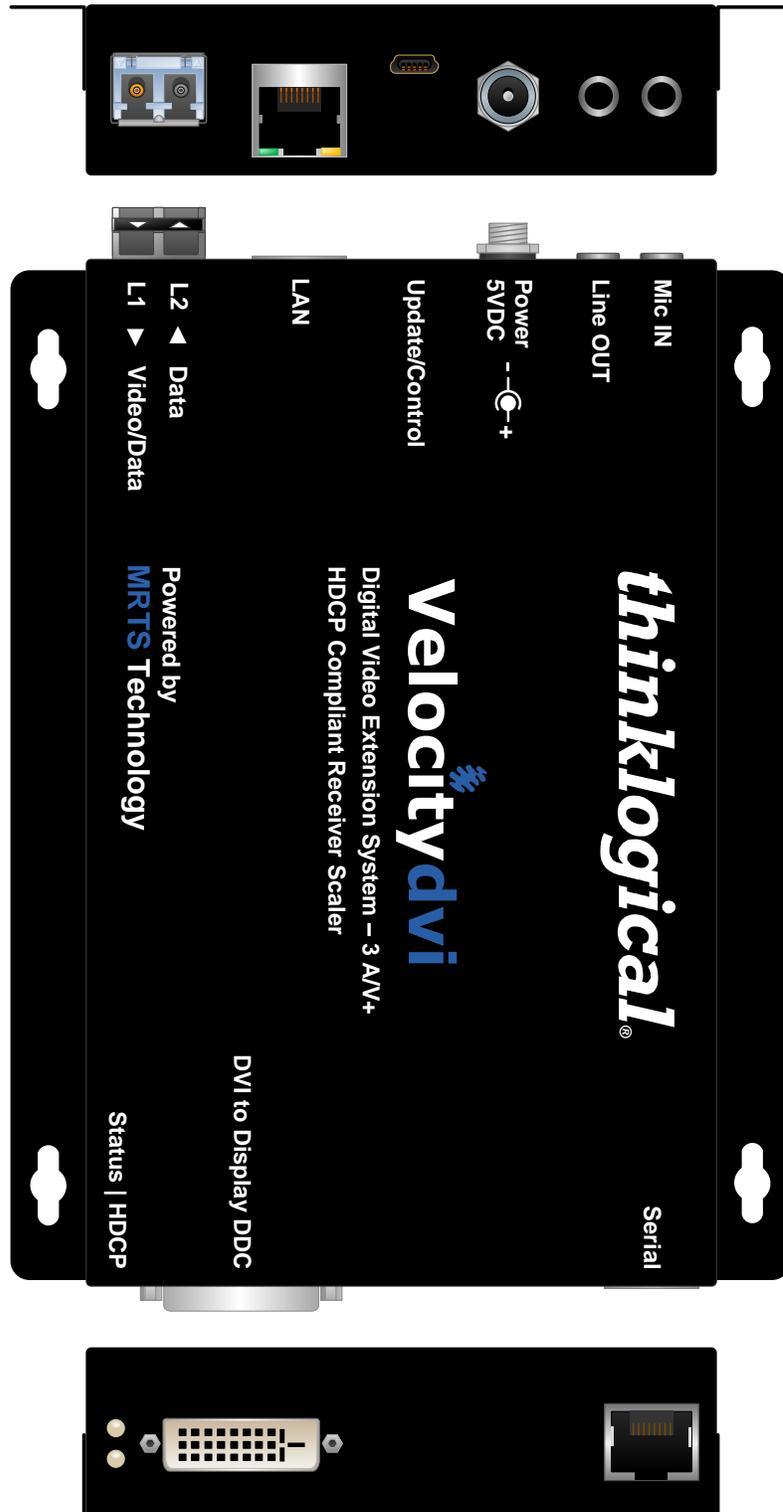
5.57" W x 7.00" D x 1.13"H (14.15cm x 17.78cm x 2.87cm)

VelocityDVI-3S Scaling Receiver, HDCP Compliant Receiver
VEL-0000S3-LCRX



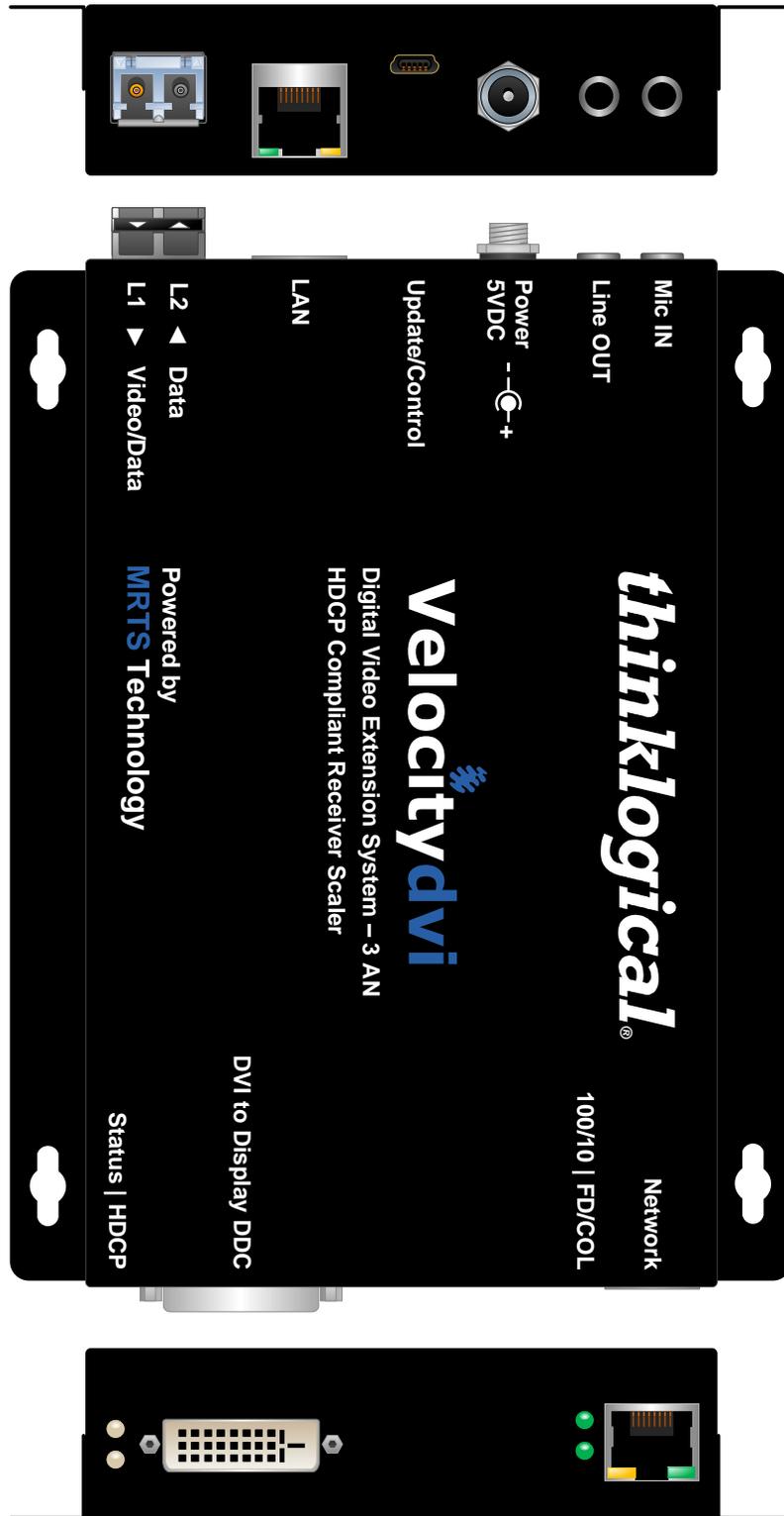
5.44" W x 7.00" D x 1.19" H (13.82cm x 17.78cm x 3.02cm)

**VelocityDVI-3SA Scaling Receiver, Audio/Serial, HDCP Compliant Receiver
VEL-AV00S3-LCRX**



5.44" W x 7.00" D x 1.19" H (13.82cm x 17.78cm x 3.02cm)

VelocityDVI-3SN Audio/Network, Scaling Receiver, HDCP Compliant Receiver
VEL-AN00S3-LCRX



5.44" W x 7.00" D x 1.19" H (13.82cm x 17.78cm x 3.02cm)

3.2.3. VelocityDVI Chassis Dimensions

VelocityDVI Model	Inches	Metric
VEL-3, -3AV+, -3AN+	5.57"W x 7.0"D x 1.13"H	141.48mm x 177.80mm x 28.70mm
VEL-3H, -3AH, -3NH	5.57"W x 7.0"D x 1.13"H	141.48mm x 177.80mm x 28.70mm
VEL-3S, -3SA, -3SN	5.44"W x 7.0"D x 1.19"H	138.18mm x 177.80mm x 30.23mm

4. DDC and EDID

DDC (Display Data Channel) is a VESA standard transport medium between a CPU's graphics adapter and monitor. The DDC is used to pass **EDID (Extended Display Identification Data)**, which is stored in the monitor and describes its characteristics (vendor name, serial number, frequency range, etc.). With this information the CPU and video card can determine what resolutions the monitor is capable of.

The DDC bus can be unidirectional or bidirectional. A bidirectional bus supports content protection (HDCP) and display calibration software. (**High-bandwidth Digital Content Protection** is a specification used to encrypt and protect digital video and audio signals transmitted between two HDCP-enabled devices.)



NOTE: Most DVI-D graphics adapters will not boot if a valid EDID table is not received at power up.

4.1. VelocityDVI-3 DDC Modes

4.1.1. Remote Dynamic Mode

Two fibers required

The unit acts as a direct connection between the RX and TX. In this mode DDC data is read at the RX and sent to the TX. Once verified at the TX, the information is written into a PROM on the TX and provided to the CPU video card. The RX will only send DDC data to the TX when it detects that a new display device with a different EDID table has been connected to the RX.

Advantages: Allows CPU video card to boot when there is no fiber connection to the RX.

Limitations: No communication link between the CPU and the display. Prevents monitor configuring/color tuning.

4.1.2 Remote Static Mode

Two fibers required to acquire DDC data, 1 fiber thereafter

Remote Static Mode is a subset of Dynamic Mode in that once a transfer from the RX to the TX is completed successfully no other transfer will be made unless specifically requested by using the **ACQUIRE** Button. The DDC data stored in the TX PROM will not change regardless of display changes.

Advantages: Allows the user to acquire and use an EDID table regardless of changes in connection at the RX.

Limitations: No communication link between the CPU and the display. Prevents monitor configuring/color tuning. May not produce video if a display with lower resolution capability is subsequently connected.

4.1.3 Pass-Thru Mode

Two fibers required

The units act as a direct connection between the TX and RX. This mode allows the CPU to communicate directly with the monitor.

Advantages: Allows monitor color tuning.

Limitations: If a monitor is not connected to the RX, most video cards will not boot. Does not support HDCP.

4.1.4 Local Static Mode

One fiber required

Local Static mode operates in the same manner as Remote Static mode except that the EDID table is read from a monitor plugged into the local port of the TX. Once the **ACQUIRE** button is pressed the TX will begin communicating with the locally connected monitor until a valid EDID table is read. The table will then be stored on the TX and presented to the CPU.

Advantages: Allows the user to acquire and use an EDID table regardless of changes in connection at the RX

The EDID table can be loaded before the TX is installed.

Limitations: No communication link between the CPU and the display. This prevents the use of monitor configuring /color tuning and may result in loss of remote video if a display with lower resolution capability is connected to the RX.



4.2 Load Default EDID Table

Holding the **ACQUIRE** and **SELECT** buttons for 5 seconds will reload the default DDC table into the TX, and switch the DDC mode to Remote Static. The TX Status LED will turn Orange while the default table is loaded and then change to Green.

Advantages: Sends a valid EDID table to the CPU so the graphics adapter can boot.

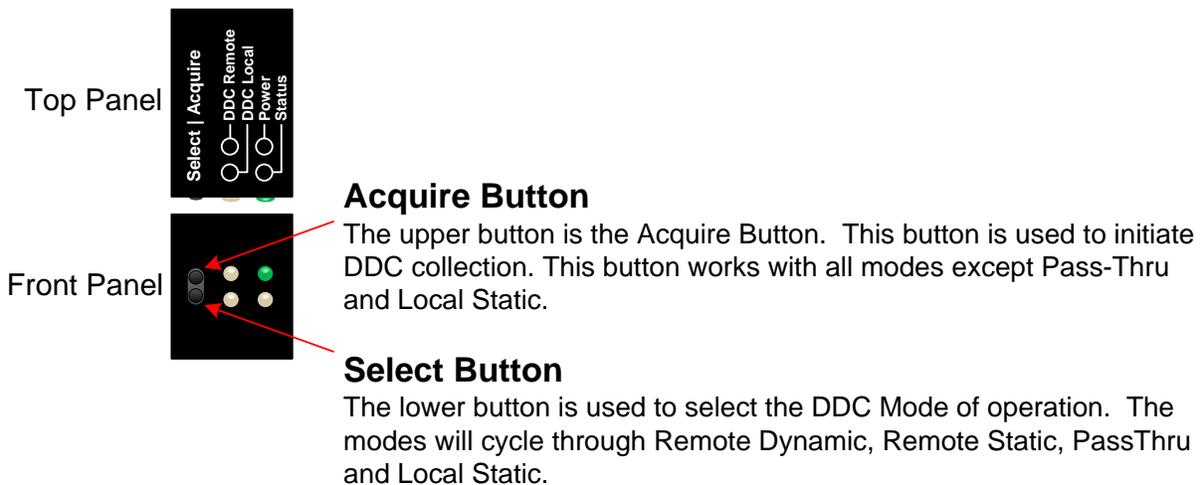
Limitations: Default EDID table may not support required resolutions.

Feature	Remote Dynamic	Remote Static	Pass-Thru	Local Static	Load Default
Supports HDCP	Yes	Yes	No	Yes	Yes
Supports monitor calibration	No	No	Yes	No	No
Monitor on RX side required to boot video	No	No	Yes	No	No
EDID table loaded from Rx	Yes	Yes	No	No	No
EDID table loaded from Tx	No	No	No	Yes	No
EDID table stored in non-volatile memory	Yes	Yes	No	Yes	Yes
Fibers required System-3	2	2 initially, then L1 only	2	1	1

EDID Capability Summary

4.2.1 VelocityDVI-3 DDC LEDs and Mode Button Operation

(See page 22 for Scaling Receiver LEDs)

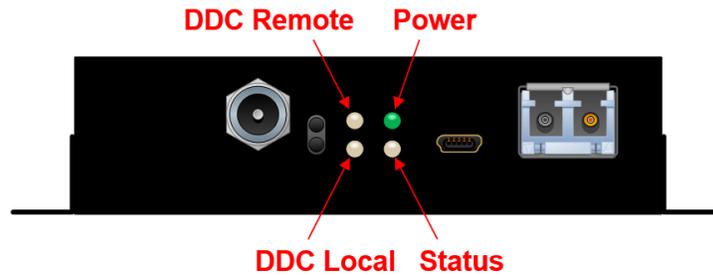


Both Buttons Held for 5 seconds:

Holding both buttons for 5 seconds will reload the default DDC table into the TX and switch to Remote Static mode.

Local and Remote LED Mode Indication

LCL	REM	DDC MODE	DESCRIPTION
 OFF	 GREEN	REMOTE DYNAMIC	EDID READ FROM REMOTE DISPLAY AND UPDATED EACH TIME REMOTE DISPLAY CHANGES.
 ORANGE	 GREEN	REMOTE STATIC	EDID READ FROM REMOTE DISPLAY WHEN ACQUIRE BUTTON IS PRESSED.
 GREEN	 GREEN	PASS-THRU	ACTS AS A DIRECT CONNECTION BETWEEN CPU AND DISPLAY. NO EMULATION IS PERFORMED.
 GREEN	 ORANGE	LOCAL STATIC	EDID READ FROM LOCAL DISPLAY WHEN ACQUIRE BUTTON IS PRESSED.



TX Status LED indicates the connection status of the TX Extender.

Green = Fiber L2 is connected and a good link is established.

Orange = Local Static Mode selected and no fiber link from RX to TX (L2 is not connected), or both buttons are held down and the unit is waiting to reload the default DDC table.

Red Flashing = No Fiber Link from RX to TX.

RX Status LED indicates the connection status of the RX Extender.

Green = Good Link and DVI monitor connected to primary port (port on right looking at DVI connectors).

Orange = No DVI monitor connected to primary port.

Red Flashing = No Fiber Link from TX to RX (L1 is not connected).

Power LED: When lit, the **Green LED** near the power jack indicates that +5VDC power is applied to the unit.

4.2.2. Scaling Receiver STATUS and HDCP LEDs



At initial Power ON:

Status LED

RED blinking = No optical connection

GREEN = Good optical connection

AMBER = Monitor (Hot Plug) not detected

HDCP LED

GREEN = Good HDCP signal received and decryption OK

GREEN blinking = Received DVI or unencrypted HDCP

5. Regulatory & Safety Compliance

5.1. Symbols Found on the Product

Markings and labels on the product follow industry-standard conventions. Regulatory markings found on the products comply with domestic and many international requirements.

5.2. Regulatory Compliance

Thinklogical's® products are designed and made in the U.S.A. These products have been tested by a certified testing laboratory and found to be compliant with the following standards (both domestic USA and many international locations):

5.2.1. North America

Safety

ANSI/UL60950-1: 1st Edition (2003)
CAN/CSA C22.2 No. 60950-1-03
CENELEC EN 60950-1, 1st Edition (2001)

LASER Safety

CDRH 21CFR 1040.10
Class 1 LASER Product
IEC60825:2001 Parts 1 and 2
Class 1 LASER Product

Electromagnetic Interference

FCC CFR47, Part 15, Class A
Industry Canada ICES-003 Issue 2, Revision 1



5.2.2. Australia & New Zealand

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

5.2.3. European Union

Declaration of Conformity

Manufacturer's Name & Address:

Thinklogical, LLC®
100 Washington Street
Milford, Connecticut 06460 USA

These products comply with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

5.2.4. Standards with Which Our Products Comply

Safety

CENELEC IEC 600950-1 2nd Ed. 2005

Electromagnetic Emissions

EN55022: 1994 (IEC/CSPIR22: 1993)
EN61000-3-2/A14: 2000
EN61000-3-3: 1994

Electromagnetic Immunity

EN55024: 1998 Information Technology Equipment-Immunity Characteristics
EN61000-4-2: 1995 Electro-Static Discharge Test
EN61000-4-3: 1996 Radiated Immunity Field Test
EN61000-4-4: 1995 Electrical Fast Transient Test
EN61000-4-5: 1995 Power Supply Surge Test
EN61000-4-6: 1996 Conducted Immunity Test
EN61000-4-8: 1993 Magnetic Field Test
EN61000-4-11: 1994 Voltage Dips & Interrupts Test

5.3. Supplementary Information

The following statements may be appropriate for certain geographical regions and might not apply to your location.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.



Warning! This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective measures.



Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications in which case the user may be required to take adequate corrective measures at their own expense.



Note: This Class A digital apparatus complies with Canadian ICES-003 and has been verified as being compliant within the Class A limits of the FCC Radio Frequency Device Rules (FCC Title 47, Part 15, Subpart B CLASS A), measured to CISPR 22: 1993 limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment.



Note: The user may notice degraded audio performance in the presence of electro-magnetic fields.

5.3.1. Product Serial Number

Thinklogical products have a unique serial number, which includes a date-code, printed on an adhesive label that is affixed to the unit. The format for the date-code is *2 digits for the month*, dash, *2 digits for the year*, plus *at least four digits for a unique unit number*. For example:

05-160127 indicates the unit was built in the **5th** month of **2016**, and is unit number **127**.

5.2.2. Connection to the Product

Connections and installation hardware for our products use industry-standard devices and methods. All wiring connections to the customer equipment are designed to minimize proprietary or customized connectors and cabling. Power connections are made with regionally appropriate power cords and approved methods.

6. How to Contact Us

6.1. Customer Support

Thinklogical® is an engineering company and we will always do our best to ensure that you receive any assistance you need directly from our most knowledgeable engineers.

We believe that the first line of support comes from the design engineers that developed each particular product.

Therefore, your questions or issues will be handled promptly by our in-house engineers who are most familiar with your products. **We won't be satisfied until you are satisfied.**

Thank you for choosing Thinklogical® products for your application.

We appreciate your business and are dedicated to helping you successfully use our products.

thinklogical® is always here to help you.

To contact us, please use the following telephone numbers and internet-based methods:

Website

Check out our website for current product offerings, support information and general information about all of the products we offer.

Our internet website offers product information on all current systems, including technical specification sheets and installation guides (for viewing online or for download), product diagrams showing physical connections and other information you might need.

Internet: www.thinklogical.com



Note: Most online documents are stored as Adobe Acrobat “PDF” files. If you do not have the Adobe Acrobat reader needed to view PDF files, visit www.adobe.com for a download.

Email

Thinklogical® is staffed **Monday through Friday from 8:30am to 5:00pm**, Eastern Time Zone. We will do our best to respond to your email inquiries promptly. Please use the following email addresses:

info@thinklogical.com – Information on Thinklogical® and our products.

sales@thinklogical.com – Sales Department - orders, questions or issues.

support@thinklogical.com – Product support, technical issues or questions, product repairs and request for Return Authorization.

Telephone

Thinklogical Operator	1-203-647-8700
Product & Customer Support:	1-203-647-8798
US Commercial & Canada Sales:	1-203-647-8715
US Federal Government Sales:	1-203-647-8716
Toll Free in the Continental US:	1-800-291-3211
International Sales (Europe, Middle East, Africa):	1-203-647-8704
International Sales (Asia Pacific, Central & Latin America):	1-203-647-8734

Please contact our expert sales staff in Milford, CT. We are here Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. We'll provide a representative's direct dial phone number when you call.

If leaving a voice message, please provide a preferred time to call back so we may reach you at your convenience.

Our switchboard attendant will direct your call during regular business hours. We have an automated attendant answering our main telephone switchboard after regular business hours and holidays. Please leave voice messages for individuals at any time.

Fax

Our company facsimile number is **1-203-783-9949**. Please indicate the nature of the fax on your cover sheet and provide return contact information.

6.2. Product Support

Thinklogical's® support personnel are available **Monday through Friday from 8:30am to 5:00pm**, Eastern Time Zone. If your application requires assistance at some time outside of our normal business hours, please contact us beforehand and we will do our best to make arrangements to help you with your Thinklogical® products.

Warranty

Thinklogical, LLC® warrants this product against defects in materials and workmanship for a period of one year from the date of delivery. Thinklogical, LLC® and its suppliers disclaim any and all other warranties.



Note: Thinklogical, LLC® products carry a one year warranty, with longer term available at time of purchase on most products. Please refer to your product invoice for your products Warranty Terms & Conditions.

Defect remedy shall be the repair or replacement of the product, provided that the defective product is returned to the authorized dealer within a year from the date of delivery.

If you wish to return your device, contact the Thinklogical, LLC® authorized dealer where you purchased the device, or if you purchased directly, call Thinklogical, LLC® at **1-800-291-3211 (USA)**.

6.2.1. Return Authorization

If you need to return your Thinklogical® product to us for any reason, please get a **Return Merchandise Authorization Number (RMA#)** from Thinklogical's **Product Support Department (1-203-647-8700)** before sending the unit in.

In the event you must return a product to Thinklogical® directly, please contact **Customer Support** at **1-800-291-3211** or **1-203-647-8700**. Customer Support will ask you to describe the problem and will issue you a **Return Merchandise Authorization** number (RMA#). Pack the device in its original box, if possible, and return it with the RMA# printed on the outside of the box.



Note: DO NOT return a product to Thinklogical® without a *Return Merchandise Authorization*.

Our Addresses

If you have any product issues or questions or need technical assistance with your Thinklogical® system, please call us at **1-800-291-3211 (USA only)** or **1-203-647-8700** and let us help. If you need to write us or return a product, please use the following address: **Thinklogical, LLC®**

Attn: RMA#

**100 Washington Street
Milford, CT 06460 USA**

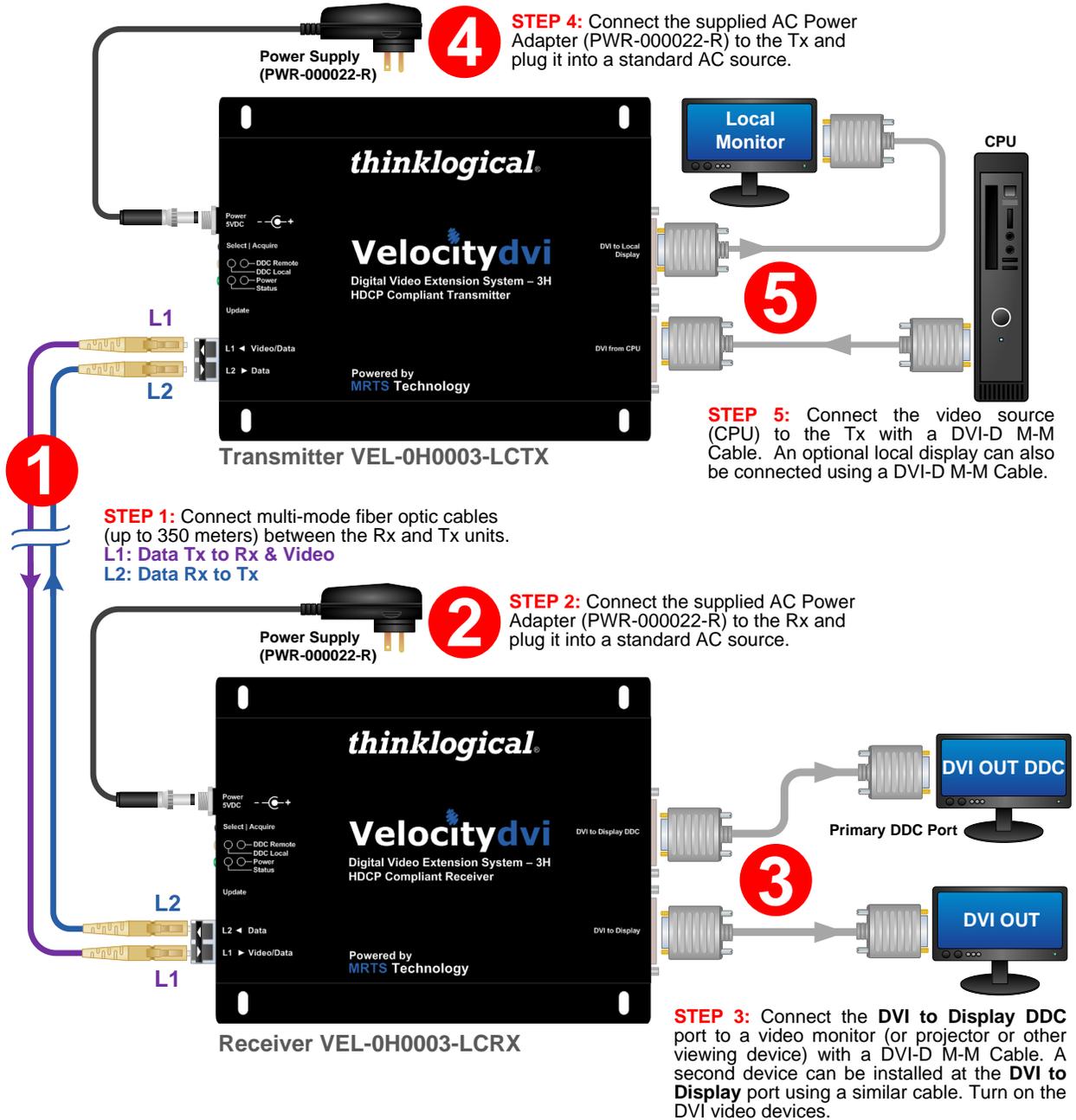


Website: www.thinklogical.com
Facebook: www.facebook.com/ThinklogicalUSA
LinkedIn: www.linkedin.com/company/thinklogical
Google+: <http://plus.google.com/u/0/109273605590791763795/about>
YouTube: www.youtube.com/user/thinklogicalNA
Twitter: @thinklogical

Appendix A: Installation Overview

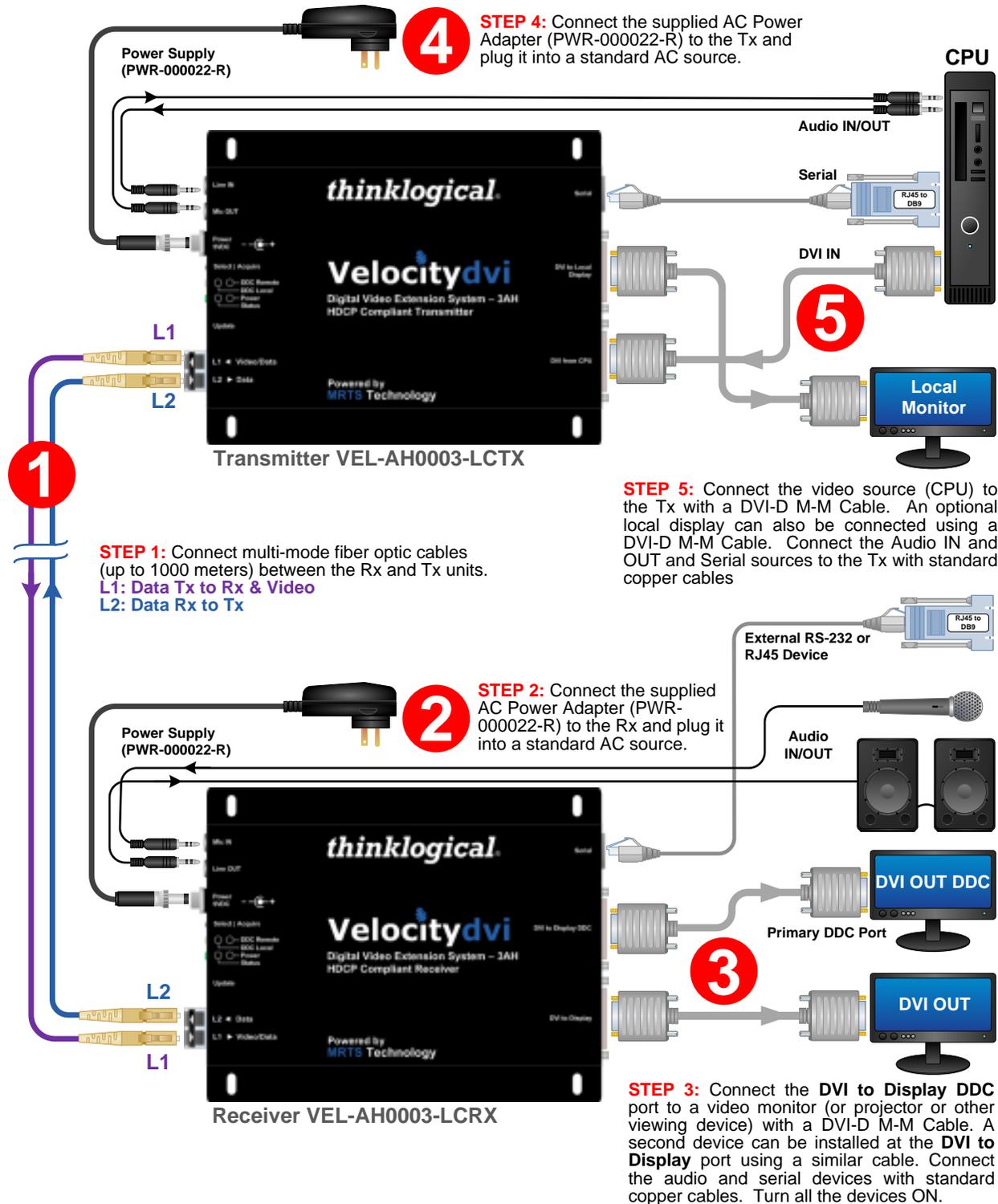
A.1. VEL-3

Velocitydvi Digital Video Extender-3H Installation Overview



A.2. VEL-3AH

Velocitydvi
Digital Video Extender-3AH Installation Overview

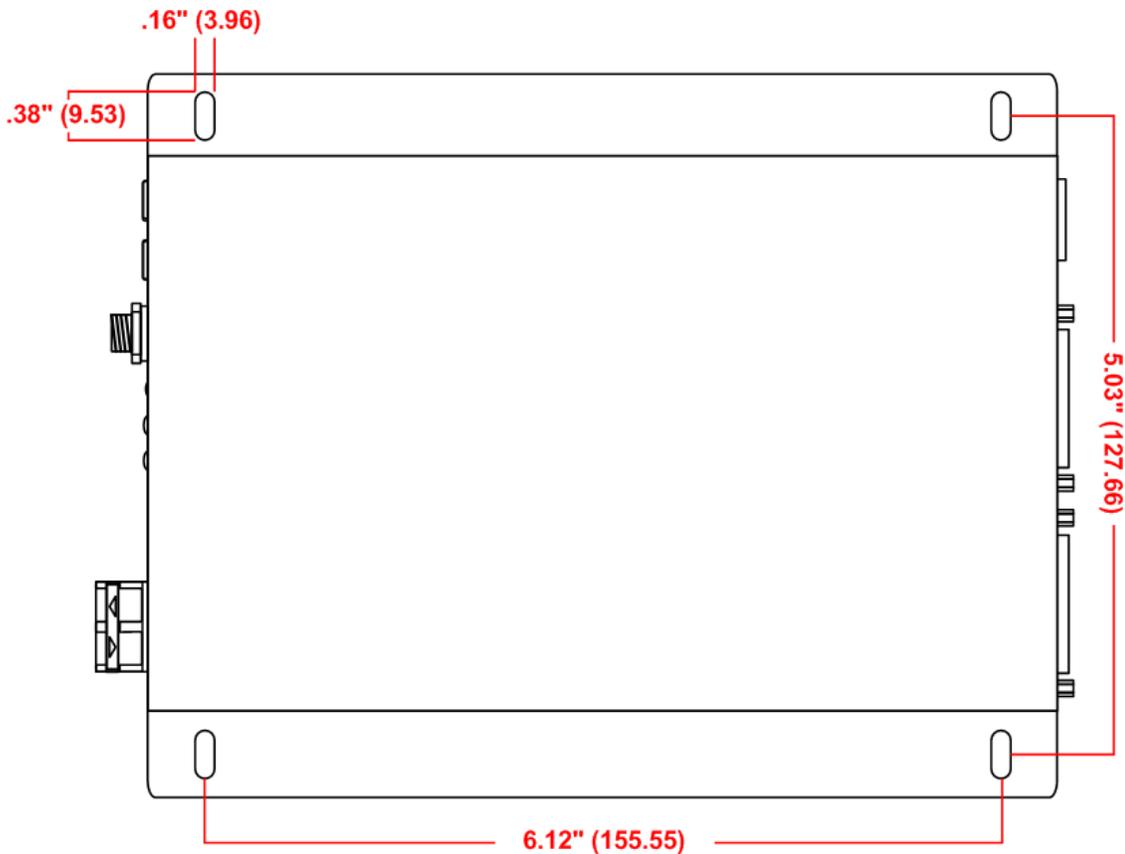
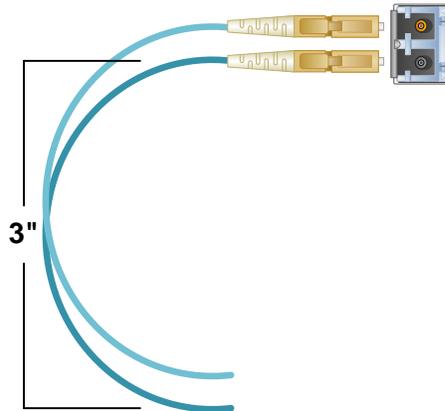


Appendix B: DVI Extender Mounting

Each **VelocityDVI Extender-3 HDCP** can be used as a desk top or wall-mounted device. Mounting centers are provided with keyhole slots. Users may choose the most appropriate fasteners and anchors to mount each unit according to the requirements of each application.

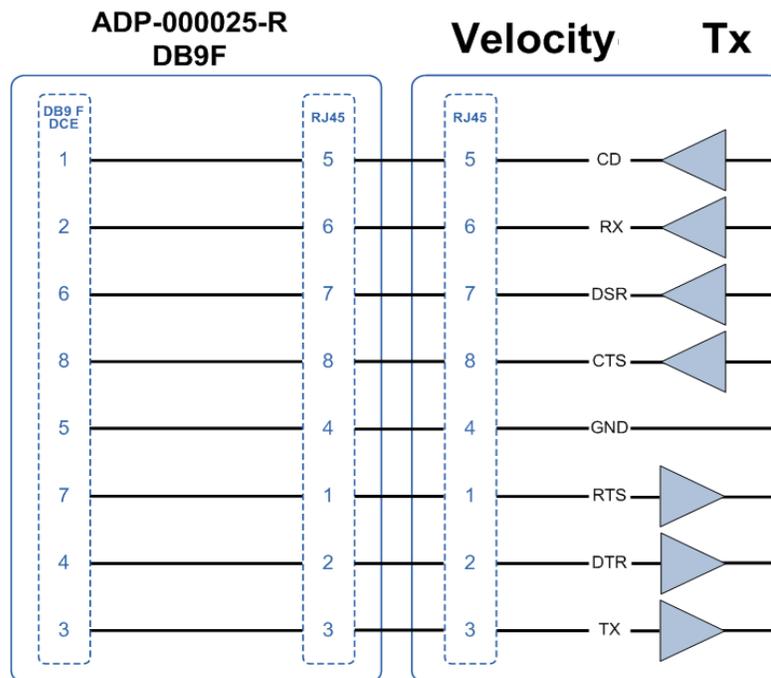
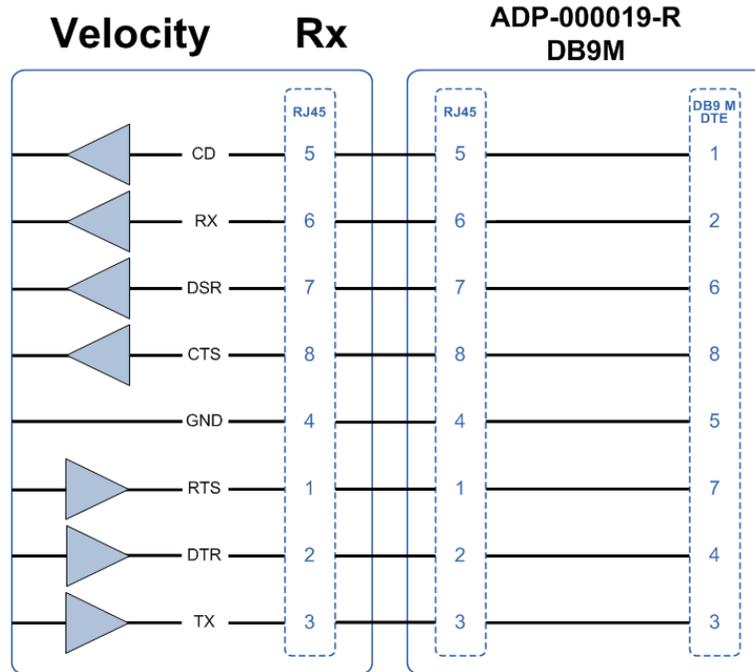


Note: Be sure to leave adequate clearance (3 inch minimum bend diameter) for your Fiber Cable.



Note: Drawings are not to scale

Appendix C: RJ-45 Adapter Pin-outs



Appendix D: VelocityDVI-3 Rx Scaling Receiver GUI Instructions

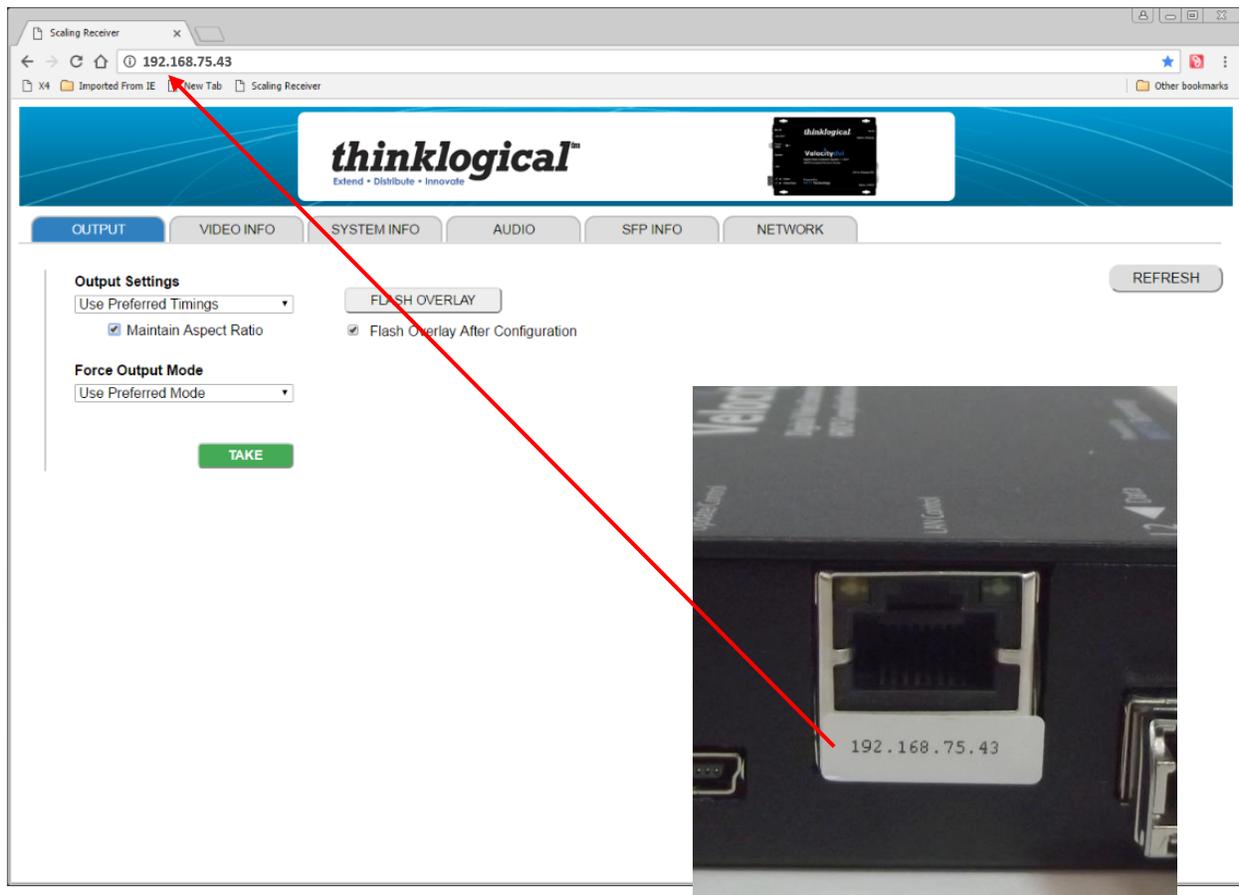
Each of Thinklogical's three stand-alone Scaling Receiver models, the **Velocity-3S**, **Velocity-3SA** (Audio) and **Velocity-3SN** (Audio/Network) are HDCP compliant. Each Scaling Receiver automatically scales the video output format to the connected monitor's preferred timing resolution and supports up to 8 channels of embedded audio. **Settings can be forced to pre-defined resolutions at the user's discretion** (see screen shots, below) **using the GUI**.

D.1. Changing a Scaling Receiver's Ethernet IP Address

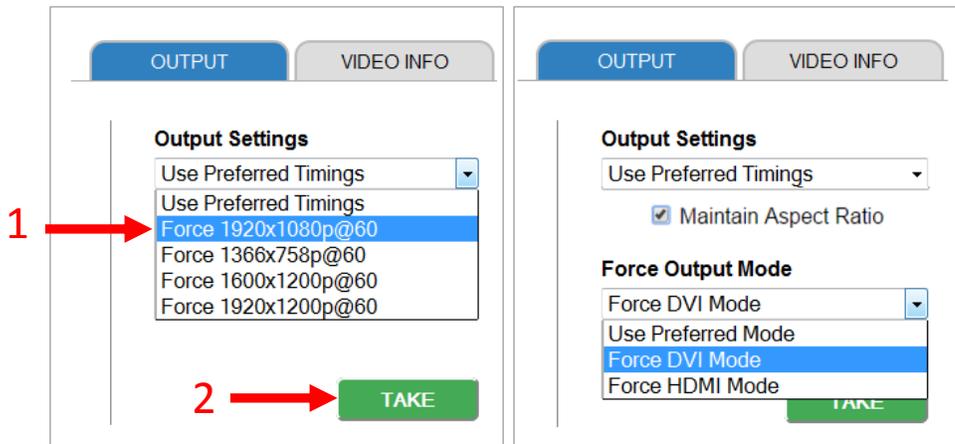
On the RJ45 LAN Control port is a sticker that shows the factory default IP address. If a different IP address is desired, it can be changed by either using the Scaling Receiver GUI as described in the following the instructions below, or by accessing the Scaling Receiver Setup Menu via the Update/Control Mini-USB port as described in Appendix E.

The Thinklogical Graphical User Interface (GUI)

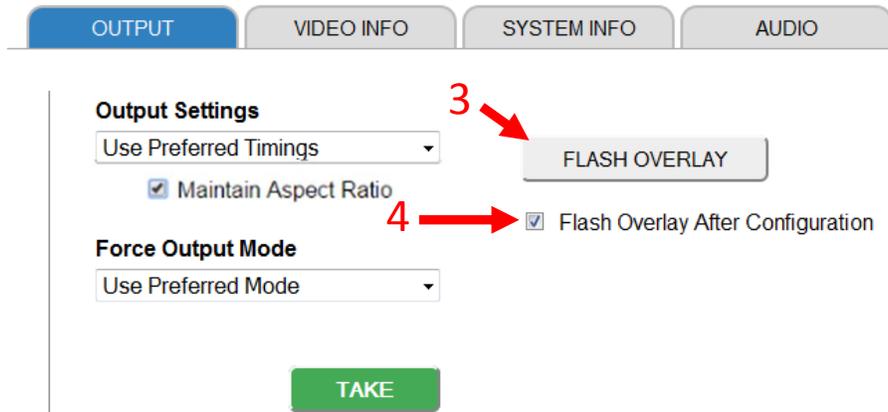
Below is the Thinklogical GUI Screen. From here the user can access the Output, Video, System, Audio, SFP and Network information and settings. To access the GUI, connect the CPU and the Scaling Receiver to an active network and open a browser. **In the browser address line, type in the IP address shown on the sticker placed below the Scaling Receiver's LAN Control port.** The following window will open:



Drop-down Menus: The user can force the output to a non-preferred timing or mode by overriding the default settings. **1.** Select the desired setting. **2.** Click on TAKE.



3. Select FLASH OVERLAY for the **on-screen display** of settings.



4. Uncheck **Flash Overlay After Configuration** to prevent the overlay from automatically displaying after syncing the video input.



Flash Overlay on-screen display of output settings

The other settings can be easily accessed by selecting the various tabs at the top of the GUI screen as shown below.

Video Information



Video Information	Input	Output
Video Format	1920x1080p@24.00	1280x720p@60.00
Horizontal Total	2750	1650
Horizontal Active	1920	1280
Horizontal Front Porch	638	110
Horizontal Sync Width	44	40
Horizontal Polarity	Positive	Positive
Vertical Total	1125	747
Vertical Active	1080	720
Vertical Front Porch	4	4
Vertical Sync Width	5	5
Vertical Polarity	Positive	Positive
HDMI Mode	DVI	DVI
Progressive	Progressive	Progressive
Frame Rate	24.00	60.00
Colorspace	RGB	RGB
Bit Depth	8	8
HDCP	Active	

System Information



System Information

Temperature	107 F (42 C)
Overlay	On
Outforce	Off
Outforce Mode	Off
L2 Status	Connected

Version Information

FPGA Version	0x0104
Software Version	65 05
GUI Version	SCRx.01.07

Audio Status

- OUTPUT
- VIDEO INFO
- SYSTEM INFO
- AUDIO

Audio Status

N Value	0
CTS Value	0
Sample Freq	0
TMD Freq	0
Channels	2
Sample Size	16

SFP Information

- OUTPUT
- VIDEO INFO
- SYSTEM INFO
- AUDIO
- SFP INFO

SFP Information

Present	True
Manufacturer	FINISAR CORP.
Part Number	FTLF8528P3BNV
Wavelength	850 nm
Temperature	42 degrees C
Tx Power	4.66 mW
Rx Power	4.68 mW
Loss of Signal	False

Network Settings

- OUTPUT
- VIDEO INFO
- SYSTEM INFO
- AUDIO
- SFP INFO
- NETWORK

Network Settings

IP Address	192.168.075.203
Mask	255.255.255.000
Gateway	000.000.000.000

SET

Appendix E: VelocityDVI-3 Scaling Receiver Setup Menu Instructions

Accessing the Setup Menu

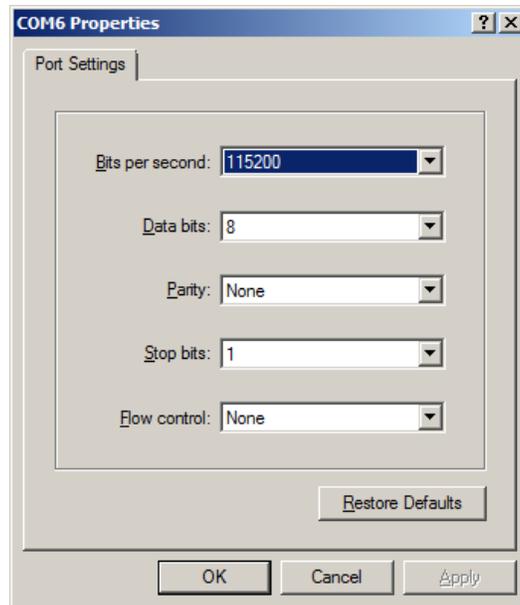
The mini USB-B connector on the unit serves as both a USB firmware update port and as an RS-232 serial connection. Establishing a serial port connection to the Scaling Receiver allows various operating parameters of the receiver to be changed according to the user's needs. Many of the settings and parameters available mirror those that are available through web interface GUI described in Appendix D, page 32.

Setting up a serial connection to the Scaling Receiver requires:

- A PC-compatible computer with one available USB port
- A USB Type A to Mini-B USB cable
- A terminal emulator program installed on the PC such as HyperTerminal, puTTY or Tera Term. The terminal emulator program selected must be capable of emulating a VT100-compatible terminal.

Perform the following steps to establish the serial connection to the Scaling Receiver:

- Apply power to the Scaling Receiver.
- Connect the USB-A to USB Mini-B cable to a Windows PC running Windows 7 and go to '**Control Panel/Device Manager/Universal Serial Bus controllers/USB Serial Converter A**'.
- Right click and select '**properties/Advanced**' and check the box '**load VCP**' (Virtual COM Port).
- Momentarily disconnect the cable and then re-connect it to re-enumerate the port.
- Open a new HyperTerminal connection or equivalent. After enumeration there will be two new COM ports. Select the last enumerated COM port in the drop-down list. Open up the higher port number of the two and set the COM port settings as shown below (115200, 8, N, 1, None):



- To ensure that the emulated terminal is VT100 (in HyperTerminal), disconnect the terminal session, select **File/Properties/Settings** tab and set the **Emulation** drop-down box to **VT100**.
- Reconnect terminal session.



NOTE: If no valid video source via the optical input to the Scaling Receiver is detected, the message “HB Lost = 280” will be displayed in the terminal window repeatedly until either a valid input is connected or real-time updates to the setup menu screen are suppressed. To suppress real-time updates, press CTL+D. To restore real-time updates at any time, press Esc.**

- Enter **<CR>** (Carriage Return) and the following screen will be displayed

```
s - HyperTerminal
File Edit View Call Transfer Help
[Icons]
a: Set Output Select          b: Text Overlay menu
c: System Information        d: Ethernet Settings
e: System Settings          f: Audio Settings

Select Item or SPACE bar for repeat menu or CR for top menu: _

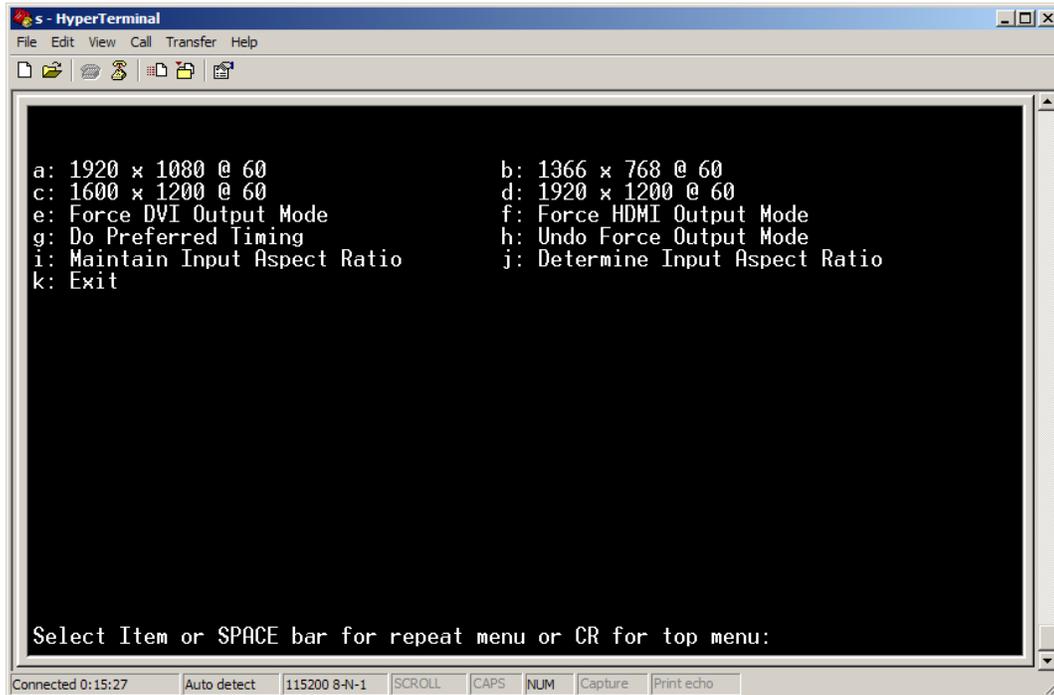
Connected 0:08:50  Auto detect  115200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

- To perform a function on the Setup menu, enter the letter located next to the desired function. Either the desired function will be performed or a sub-menu with additional functions will be entered. No **<CR>** is required, and the function is executed immediately.
- As indicated on the Setup menu top screen, entering **SPACE** will repeat the displayed menu, and entering **<CR>** will cause the top menu to be displayed.

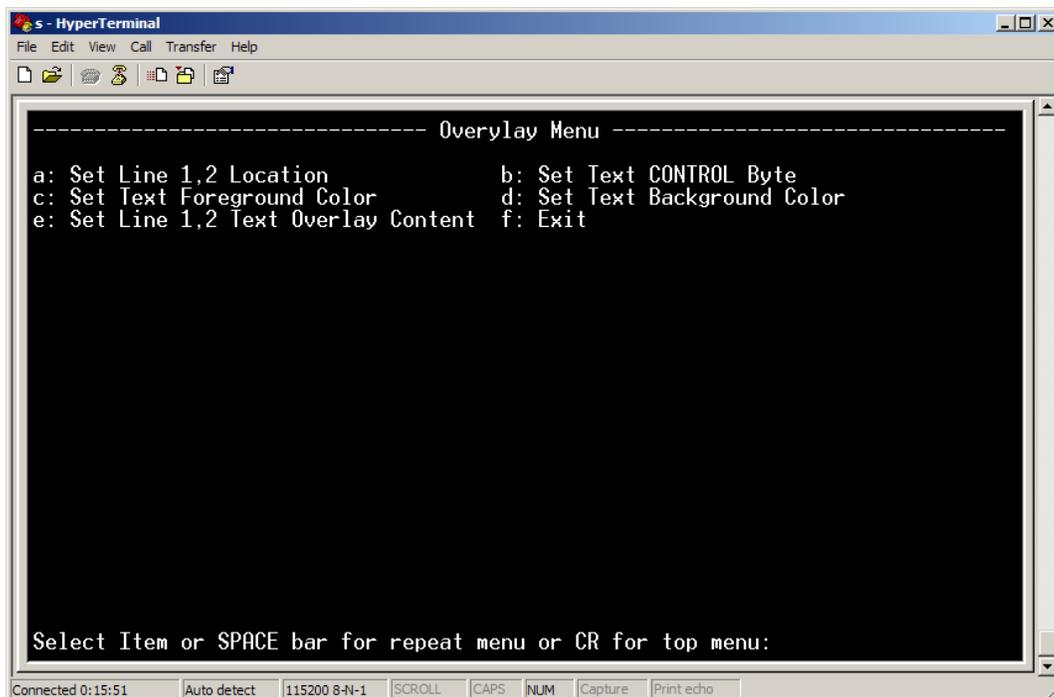
Setup Menu Item Selections

The top Setup menu allows access to many settings of the Scaling Receiver's operating parameters. **The following is a brief description of the major selections on the menu.** Many of the settings available from the Setup menu are largely self-explanatory. *For clarification of functions which are not self-explanatory, contact Thinklogical Tech Support (203-647-8700).*

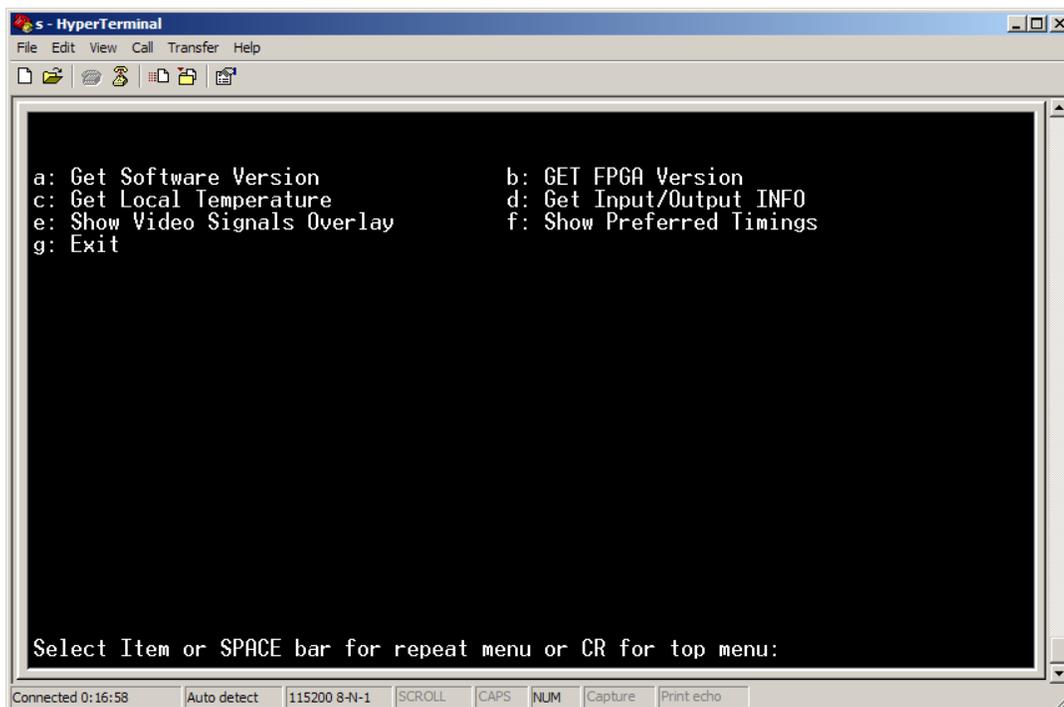
- a: Set Output Select



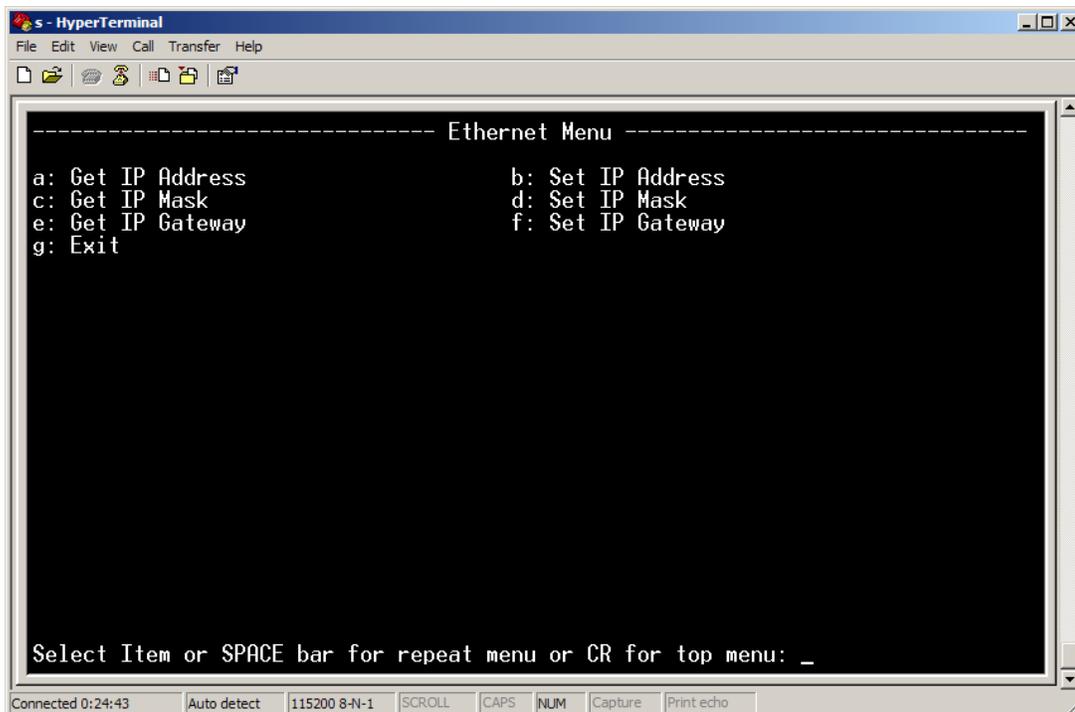
- b: Overlay Menu



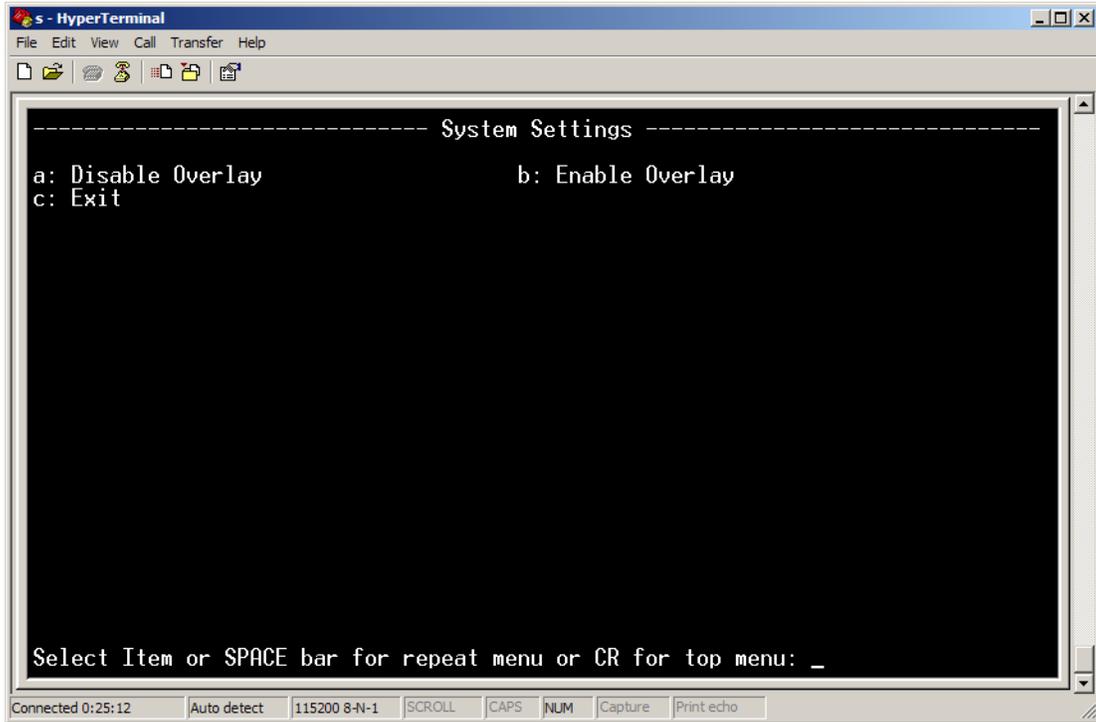
- c: System Information



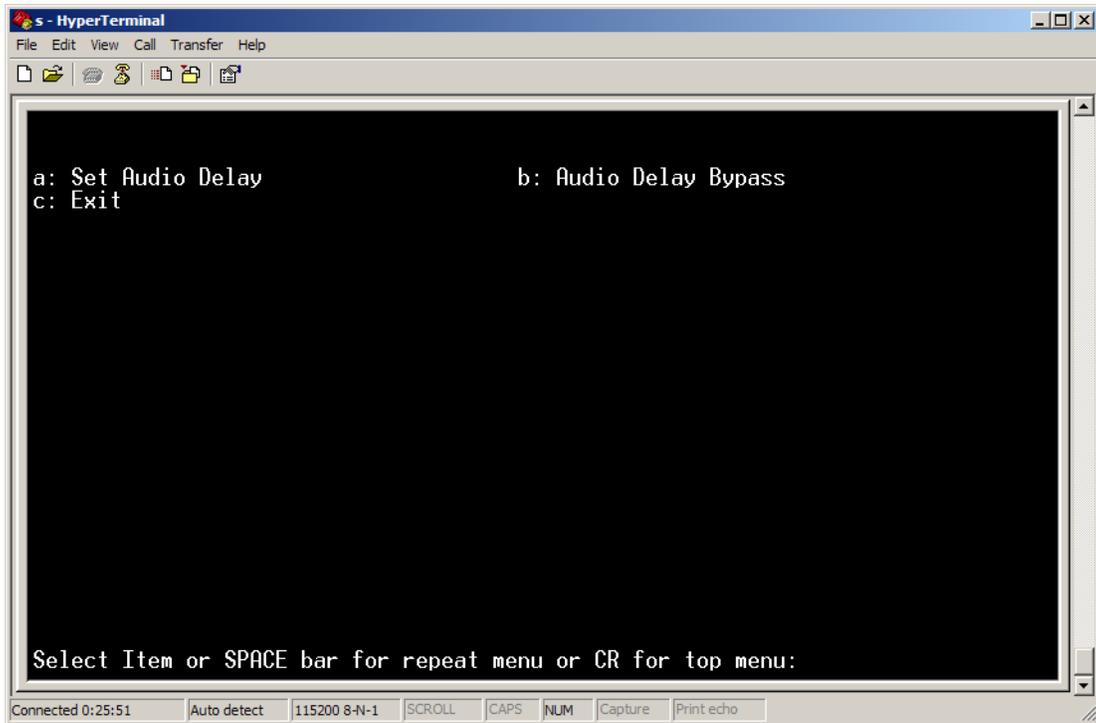
- d: Ethernet Settings



- e: System Settings



- f: Audio Settings



Appendix F: VelocityDVI-3 Scaling Receiver Supported Input Resolutions

This table indicates the input resolutions and timings that the VelocityDVI-3 Scaling Receiver is capable of accepting. For resolutions that are not indicated, contact Thinklogical Tech Support (203-647-8700).

VESA Standard Resolutions		Common HDTV Resolutions	
VGA 640X350 85HZ	XGA 1280X960 85HZ	SD 720X480i 59.94HZ	SD 2880X576i 50HZ
VGA 640X400 85HZ	XGA 1280X1024 60HZ	SD 720X480i 60HZ	SD 2880X288p 50HZ
VGA 720X400 85HZ	XGA 1280X1024 75HZ	HD 1920X1080i 59.94HZ	SD 1440X576p 50HZ
VGA 640X350 70HZ	1400X1050 SXGA 60HZ	HD 1920X1080i 60HZ	SD 2880X480p 59.94HZ
VGA 640X400 60HZ	XGA 1280X1024 85HZ	HD 1920X1080i 50HZ	SD 2880X576p 50HZ
VGA 640X480 75HZ	1680X1050 RB 60HZ	SD 720X480p 59.94HZ	HD 1920X1250i 50HZ
VGA 640X480 85HZ	1680X1050 CVT 60HZ	SD 720X480p 60HZ	HD 1920X1080i 100HZ
VGA 640X480 72HZ	WUXGA 1920X1200 60HZ	SD 720X576p 50HZ	HD 1280X720p 100HZ
VGA 640X480 60HZ	UXGA 1600X1200 60HZ	HD 1280X720p 59.94HZ	SD 720X576p 100HZ
SVGA 800X600 56HZ	UXGA 1600X1200 65HZ	HD 1280X720p 60HZ	SD 1440X576i 100HZ
SVGA 800X600 75HZ	UXGA 1600X1200 70HZ	HD 1280X720p 50HZ	HD 1920X1080i 120HZ
SVGA 800X600 60HZ	UXGA 1600X1200 75HZ	HD 1920X1080p 59.94HZ	HD 1280X720p 120HZ
SVGA 800X600 85HZ	UXGA 1600X1200 85HZ	HD 1920X1080p 60HZ	SD 720X480p 120HZ
SVGA 832X624 75HZ	WUXGA 1792X1344 60HZ	HD 1920X1080p 29.97HZ	SD 1440X480i 120HZ
SVGA 800X600 72HZ	WUXGA 1792X1344 75HZ	HD 1920X1080p 30HZ	SD 720X576p 200HZ
WXGA 1280X768 60HZ	WUXGA 1856X1392 60HZ	HD 1920X1080p 25HZ	SD 720X576i 200HZ
WXGAP 1360X768 60HZ	WUXGA 1856X1392 75HZ	HD 1920X1080p 50HZ	SD 720X480p 240HZ
XGA 1024X768 72HZ	WUXGA 1920X1440 60HZ	HD 1920X1080p 23.97HZ	SD 1440X480i 240HZ
XGA 1024X768 75HZ	WUXGA 1920X1440 75HZ	HD 1920X1080p 24HZ	HD 1280X720p 24HZ
XGA 1024X768 60HZ	UXGA 1600X1200 60HZ RT	HDMI (Based on VICS)	HD 1280X720p 25HZ
XGA 1024X768 70HZ	UXGA 1600X1200 50HZ RT	SD 1440X240p 59.94HZ	HD 1280X720p 30HZ
XGA 1024X768 85HZ		SD 2880X480i 59.94HZ	HD 4KX2K 30HZ
XGA 1152X864 75HZ		SD 2880X240p 59.94HZ	HD 4KX2K 25HZ
XGA 1152X870 75HZ		SD 1440X480p 59.94HZ	HD 4KX2K 24HZ
XGA 1280X960 60HZ		SD 1440X288p 50HZ	HD 4KX2K SMPTE 24HZ